



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

NPL-404-2

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

Date: July 31, 1995

Identification Number: ARD084930148
Site Name: Arkwood, Inc.
Region: 6

This notice is included in the Hazard Ranking System package located within each Regional docket and the Headquarters docket to clarify what the National Priorities Site, Arkwood, Inc., represents. This has been added to ensure that the listing is consistent with policy.

When a site is listed, it is necessary to identify or define the release (or releases) encompassed within the listing. The approach generally used is to delineate a geographical area (usually the area within the installation or plant boundaries) and define the site by reference to that area. As a legal matter, the site is not coextensive with that area, and the boundaries of the installation or plant are not the "boundaries" of the site. Rather, the site consists of all contaminated areas within the area used to define the site, and any other location to which contamination from that area has come to be located.

While geographic terms are often used to designate the site (e.g., the "Jones Co. plant site") in terms of the property owned by the particular party, the site properly understood is not limited to that property (e.g., it may extend beyond the property due to contaminant migration), and conversely may not occupy the full extent of the property (e.g., where there are uncontaminated parts of the identified property, they may not be, strictly speaking, part of the "site"). The "site" is thus neither equal to nor confined by the boundaries of any specific property that may give the site its name, and the name itself should not be read to imply that this site is coextensive with the entire area within the property boundary of the facility or plant. The precise nature and extent of the site are typically not known at the time of listing.

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38 NON-FEDERAL FACILITIES & 3 FEDERAL FACILITY HAZARD RANKING SYSTEM
WORKSHEETS AND DOCUMENTATION RECORDS, NARRATIVE SUMMARIES AND BIBLIO-
GRAPHY DOCUMENTS CONTINUED (NPL-U4-2)

REGION VI

NPL-U4-2-30 Arkwood, Inc., Omaha, AR 27 pages.

REGION VII

NPL-U4-2-31 A.Y. McDonald Manufacturing Co., Dubuque, IA 23 pages.
NPL-U4-2-32 John Deere (Dubuque Works), Dubuque, IA 23 pages.
NPL-U4-2-33 Lawrence Todtz Farm, Camanche, IA 23 pages.
NPL-U4-2-34 Midwest Manufacturing/North Farm, Kellogg, IA 24 pages.
NPL-U4-2-35 Shaw Avenue Dump, Charles City, IA 19 pages.
NPL-U4-2-36 Monroe Auto Equipment Co., Cozad, NE 23 pages.

REGION VIII

NPL-U4-2-37 Martin Marietta (Denver Aerospace), Waterton, CO 18 pages.
NPL-U4-2-38 Silver Creek Tailings, Park City, UT 20 pages.

REGION IX

(NONE)

REGION X

NPL-U4-2-39 Naval Air Station, Whidbey Island, (Ault) WA 26 pages.
NPL-U4-2-40 Naval Air Station, Whidbey Island, (Seaplane) WA 23 pages.
NPL-U4-2-41 Wyckoff Co. - Eagle Harbor, Bainbridge Island, WA 30 pages.

APR 12 1985

Arkwood, Inc.
Omaha, Arkansas

Arkwood, Inc. is located at the Missouri-Pacific's Cricket Railroad siding, south of Omaha in Boone County, Arkansas. The site is approximately 20 acres in size, situated in Section 27, T21N R21W on the Omaha, Ark-Mo Quad map.

Arkwood was founded and originally operated by H.C. Ormand in the early 1960's. Mr. Ormand leased the process and land to Mass Merchandisers, Inc. of Harrison, Arkansas in the mid 1970's. Mass Merchandisers are the current operators of the site. Their representatives are Bob Barker and Devoe Gregory of the Wood Products Group. Mass Merchandisers's lease expired January 1, 1985 and was not renewed. The plant has not been operated since then.

The business consists of a millwork shop, a woodtreating operation using pentachlorophenol and creosote and a storage yard for the treated wood products before sale. The wastes from the wood treating operation, according to Mr. Barker and Mr. Gregory, were dumped into a cave at the treating plant from the beginning of the operation to around 1970 when the cost of the chemicals used in the treatment process forced a recovery system to be employed. The cave has been closed by boarding the entrance and covering it with a layer of dirt. (The entrance is flush with the ground surface). The wastes consist of the liquid from washing down of the treatment room floor and the cleaning of the treatment cylinder. These wastes were accumulated in a tank and then spread over the storage yard for dust control. Mr. Barker stated that, based on plant operation during 1970, a minimum of 6-7000lbs/yr of waste were generated over the 22 years of operation. However, prior to 1970 when recovery begun, the operation generated significantly more waste than minimum per year estimate. There are also a pit (40yd³) containing waste adjacent to the site next to the railroad and a waste pile of sawdust and woodchips (5954 yd³).

Arkwood, Inc. notified under RCRA as a generator of hazardous waste, but has never been issued and does not now hold any type of permit.

There are approximately 660 persons living within a 3 mile radius of the site whose water supply is groundwater. PCP has been detected in local water wells, natural springs in the area and in nearby Walnut Creek by State sampling. A new water well for a resident 400 feet west of the site has just been completed.

Gerraghaty-Miller has been retained by Mass Merchandisers for a geohydrological study. An Administrative Order is in the final phase of preparation by the State.

Adjusted Final
March, 1989

06 AR 015

NPL-U4-2-30 cont.

Facility name:	Arkwood, Inc.
Location:	Crickett, Boone County, Ark. South of Omaha
EPA Region:	VI
Person(s) in charge of the facility:	Bud Grisham
	Hallie C. Ormand
Name of Reviewer:	Tim Perdue, EPA, Doice Hughes, ADPCE
General description of the facility:	Date: 3/26/85
(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action, etc.)	
The site is located on a 15-20 acre site in Section 27T21NR21W.	
South of Omaha in Boone County, Arkansas. The site has a Millwork	
Shop, pcg and creosote treatment process area, storage tanks and	
a storage yard. Wastes were dumped in a cave located onsite.	
PCP has been detected in groundwater and surface water.	
Scores: $S_M = 28.95$ ($S_{gw} = 50.0$, $S_{sw} = 0$, $S_a = 0$)	
$S_{FE} = 0$	
$S_{DC} = 25.0$	

FIGURE 1
HRS COVER SHEET

QA -
R. Channing Johnson
19 April 1985
Jas. H. G. G. G.
2/1/89

Ground Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)		Multi- plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0	45	1	45	45	3.1
If observed release is given a score of 45, proceed to line 4 . If observed release is given a score of 0, proceed to line 2 .						
2 Route Characteristics						3.2
Depth to Aquifer of Concern	0	1 2 3	2		6	
Net Precipitation	0	1 2 3	1		3	
Permeability of the Unsaturated Zone	0	1 2 3	1		3	
Physical State	0	1 2 3	1		3	
Total Route Characteristics Score				—	15	
3 Containment	0	1 2 3	1	—	3	3.3
4 Waste Characteristics						3.4
Toxicity/Persistence	0	3 6 9 12 15 18	1	18	18	
Hazardous Waste Quantity	0	1 2 3 4 5 6 7 8	1	4	8	
Total Waste Characteristics Score				22	26	
5 Targets						3.5
Ground Water Use	0	1 2 3	3	9	9	
Distance to Nearest Well/Population Served	0	4 6 8 10	1	10	40	
Total Targets Score				29	49	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5				28710	57.330	
7 Divide line 6 by 57,330 and multiply by 100				S _{gw} = 50.08		

FIGURE 2
GROUND WATER ROUTE WORK SHEET

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2/1/89

Surface Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)		Multi- plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0	45	1		45	4.1
If observed release is given a value of 45, proceed to line 4 . If observed release is given a value of 0, proceed to line 2 .						
2 Route Characteristics						4.2
Facility Slope and Intervening Terrain	0	1	2	3	1	3
1-yr. 24-hr. Rainfall	0	1	2	3	1	3
Distance to Nearest Surface Water	0	1	2	3	2	6
Physical State	0	1	2	3	1	3
Total Route Characteristics Score						15
3 Containment	0	1	2	3	1	3
4 Waste Characteristics						4.4
Toxicity/Persistence	0	3	6	9	12	15
Hazardous Waste Quantity	0	1	2	3	4	5
	6	7	8	1		8
Total Waste Characteristics Score						26
5 Targets						4.5
Surface Water Use	0	1	2	3	3	9
Distance to a Sensitive Environment	0	1	2	3	2	6
Population Served/Distance to Water Intake Downstream	0	4	6	8	10	1
	12	16	18	20		40
	24	30	32	35	40	
Total Targets Score						55
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5					64,350	
7 Divide line 6 by 64,350 and multiply by 100						S _{sw} =

**FIGURE 7
SURFACE WATER ROUTE WORK SHEET**

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2/1/89

Air Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)	
1 Observed Release	0 45	1	0	45	5.1	
Date and Location: NOT SCORED						
Sampling Protocol:						
If line 1 is 0, the $S_a = 0$. Enter on line 5 . If line 1 is 45, then proceed to line 2 .						
2 Waste Characteristics					5.2	
Reactivity and Incompatibility	0 1 2 3	1		3		
Toxicity	0 1 2 3	3		9		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8		
Total Waste Characteristics Score				20		
3 Targets					5.3	
Population Within 4-Mile Radius	0 9 12 15 18 21 24 27 30	1	0	30		
Distance to Sensitive Environment	0 1 2 3	2	0	6		
Land Use	0 1 2 3	1	0	3		
Total Targets Score			0	39		
4 Multiply 1 x 2 x 3				35,100		
5 Divide line 4 by 35,100 and multiply by 100			$S_a = 0$			

FIGURE 9
AIR ROUTE WORK SHEET

Ref
 4/19/85
 2/1/89

	S	S ²
Groundwater Route Score (S _{gw})	50.08	2508.01
Surface Water Route Score (S _{sw})	0	0
Air Route Score (S _a)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		2508.01
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		50.08
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		28.95

FIGURE 10
WORKSHEET FOR COMPUTING S_M

Wanda D. Bokal
2/1/89

Fire and Explosion Work Sheet						
Rating Factor	Assigned Value (Circle One)		Multi- plier	Score	Max. Score	Ref. (Section)
1 Containment	1	3	1		3	7.1
2 Waste Characteristics						7.2
Direct Evidence	0	3	1		3	
Ignitability	0	1 2 3	1		3	
Reactivity	0	1 2 3	1		3	
Incompatibility	0	1 2 3	1		3	
Hazardous Waste Quantity	0	1 2 3 4 5 6 7 8	1		8	
Total Waste Characteristics Score					20	
3 Targets						7.3
Distance to Nearest Population	0	1 2 3 4 5	1		5	
Distance to Nearest Building	0	1 2 3	1		3	
Distance to Sensitive Environment	0	1 2 3	1		3	
Land Use	0	1 2 3	1		3	
Population Within 2-Mile Radius	0	1 2 3 4 5	1		5	
Buildings Within 2-Mile Radius	0	1 2 3 4 5	1		5	
Total Targets Score					24	
4 Multiply 1 x 2 x 3					1,440	
5 Divide line 4 by 1,440 and multiply by 100				SFE = ()		

**FIGURE 11
FIRE AND EXPLOSION WORK SHEET**

*Rec'd
4/19/85*

Direct Contact Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi- plier	Score	Max. Score	Ref. (Section)	
1 Observed Incident	0 45	1	0	45	8.1	
If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2						
2 Accessibility	0 1 2 3	1	3	3	8.2	
3 Containment	0 15	1	15	15	8.3	
4 Waste Characteristics Toxicity	0 1 2 3	5	15	15	8.4	
5 Targets					8.5	
Population Within a 1-Mile Radius	0 1 2 3 4 5	4	8	20		
Distance to a Critical Habitat	0 1 2 3	4	0	12		
Total Targets Score			8	32		
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			5400	21,600		
7 Divide line 6 by 21,600 and multiply by 100			SDC = 25.0			

FIGURE 12
DIRECT CONTACT WORK SHEET

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DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

INSTRUCTIONS: The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference that will make the document used for a given data point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.

FACILITY NAME: Arkwood

LOCATION: South of Omaha, Arkansas

QA —
R. Manning Johnson
19 April 1985

GROUND WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (3 maximum):

Natural spring (Cricket Spring) to the west of the plant showed pentachlorophenol (PCP) contamination up to 10 mg/l Ref 3, 6, 11(p. 2-26 to 2-43), and 16 .

Rationale for attributing the contaminants to the facility:

PCP wastes were deposited in an onsite cave, were spread on the ground for dust-suppression, and were found in high concentration (30,000 ppm) in dump area sawdust (Ref 4, 5, and 11, page 2-5 to 2-7)

* * *

2 ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifers(s) of concern:

Most higher elevation wells in the area are in the Boone limestone, although valley wells may be in the underlying Ordovician dolomite. Well logs for the new Behren Well, drilled to 580 feet, and other wells in the area, show no continuous shale layer separating the limestone and dolomite (Ref 7, 13, memo dated 9/29/82, 14 and 15).

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern:

Depth from the ground surface to the lowest point of waste disposal/storage:

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Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

NA

Mean annual lake or seasonal evaporation (list months for seasonal):

NA

Net precipitation (subtract the above figures):

NA

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

NA

Permeability associated with soil type:

NA

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

NA

* * *

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2/1/89

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

NA

Method with highest score:

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Pentachlorophenol (PCP)

Ref 3, 4, 5, 6, 11, 16)

Toxicity

Persistence

3

3

Compound with highest score:

Pentachlorophenol

HRS value = 18

(Ref. 1)

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

137 cubic yards

(see attached).

Basis of estimating and/or computing waste quantity:

* * *

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Approved by [Signature]
2/1/89

Railroad pit

$$60 \text{ ft} \times 15 \text{ ft} \times 3 \text{ ft} = 2700 \text{ ft}^3 \times 1 \frac{\text{yd}^3}{27\text{ft}^3} = 100 \text{ yd}^3 \quad (\text{Ref 12})$$

Waste oil contaminated with PCP and creosote were placed in the railroad ditch (Ref 11, page 2-6). Discharges of condensed steam from the treatment facility were also placed in the railroad ditch (Ref 5). At least some of the steam discharge was contaminated with PCP (Ref 13, memo dated 5/26/82). The ditch was in operation from 1971 to 1973 (Ref 11, page 2-6).

Treatment room sump

$$7500 \text{ gal} \times \frac{1 \text{ drum}}{50 \text{ gal}} \times \frac{1 \text{ yd}^3}{4 \text{ drums}} = 37 \text{ yds}^3$$

The treatment room sump measures 7500 gallons (Ref 17, page 3). The sump has leaked in the past (Ref 13, memo dated 10/17/83). A recent inspection indicated the sump to be full of liquid (Ref 18, page 7).

Total waste quantity

$$100 \text{ yds}^3 + 37 \text{ yds}^3 = 137 \text{ yds}^3 \quad \text{HRS value} = 4$$

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2/1/89

5 TARGETS

Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

Drinking water. Individual well owners do not have an alternative unthreatened supply. The Omaha well, cased to 65 feet and extending to 1315 feet deep, is also considered threatened and without an alternative supply.

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

The Binam well is located approximately 1000 feet northwest of the railroad pit.

The former Behren residence well is located approximately 500 feet west of Cricket spring. (Ref 2).

Distance to above well or building:

HRS value = 4

Population Served by Ground Water Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

193 homes in area X 3.8 people/home = 733 people

3 mile radius drawn on topo map (Reference 2) and dwellings counted. Site boundaries established from onsite contamination and contamination of Cricket Spring (Ref. 2, 3, 4, 5, 6, 11, 13, 16).

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

None in area

Total population served by ground water within a 3-mile radius:

(HRS value = 2)

HRS Targets Matrix value = 20

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SURFACE WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

Not evaluated. Distance to perennial water in Crickett Creek is 3.5 miles and in Barren Fork is 4.3 miles. Hence, there are no surface water targets for HRS purposes.

Rationale for attributing the contaminants to the facility:

* * *

2 ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent:

Name/description of nearest downslope surface water:

Average slope of terrain between facility and above-cited surface water body in percent:

Is the facility located either totally or partially in surface water?

Is the facility completely surrounded by areas of higher elevation?

1-Year 24-Hour Rainfall in Inches

Distance to Nearest Downslope Surface Water

Physical State of Waste

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Method with highest score: _

Ref
4/19/83

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated

Compound with highest score:

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

Basis of estimating and/or computing waste quantity:

* * *

5 TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

Is there tidal influence?

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

Total population served:

Name/description of nearest of above water bodies:

Distance to above-cited intakes, measured in stream miles:

*RE
4/16/74*

AIR ROUTE

1 OBSERVED RELEASE

Contaminants detected:

No data to show air release.

Date and location of detection of contaminants

Methods used to detect the contaminants:

Rationale for attributing the contaminants to the site:

* * *

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

Most incompatible pair of compounds:

Toxicity

Most toxic compound:

Hazardous Waste Quantity

Total quantity of hazardous waste:

Basis of estimating and/or computing waste quantity:

* * *

3 TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

0 to 4 mi

0 to 1 mi

0 to 1/2 mi

0 to 1/4 mi

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

RCR
4/14/92

Distance to critical habitat of an endangered species, if 1 mile or less:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Distance to residential area, if 2 miles or less:

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

FIRE AND EXPLOSION

1 CONTAINMENT

Hazardous substances present:

Site not certified by Fire Marshall
or contaminant detected as fire hazard.
Route score is 0.

Type of containment, if applicable:

2 WASTE CHARACTERISTICS

Direct Evidence

Type of instrument and measurements:

Ignitability

Compound used:

Reactivity

Most reactive compound:

Incompatibility

Most incompatible pair of compounds:

*Ref
4/17/85*

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility:

Basis of estimating and/or computing waste quantity:

* * *

3 TARGETS

Distance to Nearest Population

Distance to Nearest Building

Distance to Sensitive Environment

Distance to wetlands:

Distance to critical habitat:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Distance to residential area, if 2 miles or less:

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

Population Within 2-Mile Radius

Buildings Within 2-Mile Radius

Rec'd
4/19/89

DIRECT CONTACT

1 OBSERVED INCIDENT

Date, location, and pertinent details of incident:

None observed

* * *

2 ACCESSIBILITY

Describe type of barrier(s):

There is a front gate, but no complete barrier.

Visual observation during onsite visit on
3/25/85 by Tim Perdue, EPA and Doice Hughes,
ADPCE

* * *

3 CONTAINMENT

Type of containment, if applicable:

Spill on ground, crew spread PCP sludges and waste oil on facility grounds
to control dust

Ref. 5

* * *

4 WASTE CHARACTERISTICS

Toxicity

Compounds evaluated:

PCP Ref. 3 & 4

See groundwater section

Compound with highest score:

PCP

* * *

RA
4/19/85

5 TARGETS

Population within one-mile radius

101 homes x 3.8 = 384

Ref. 2

Distance to critical habitat (of endangered species)

Ref
4/19/83

REFERENCES

If the entire reference is not available for public review in the EPA regional files on this site, indicate where the reference may be found:

Reference Number	Description of the Reference
1	Uncontrolled Hazardous Waste Site Ranking System: A Users Manual. 47 FR 31219-31243, 16 July 1982 (Appendix A, CERCLA).
2	Topographic maps Omaha, Ark-Mo. Quad. 1967, 7.5 min Denver, Ark-Mo. Quad. 1972, 7.5 min
3	Letter from Charles McLaughlin, McClelland Consulting Engineers, Inc. to Doice Hughes, ADPCE, July 12, 1983
4	ADPCE Inspection Report to Mike Bates from Jay Justice, Nov. 5, 1981
5	Memorandum to Bob Blanz, from Mike Bates October 12, 1981
6	Letter McClelland Consulting Engineers, Inc. To: Doice Hughes, ADPCE: From Charles McLaughlin May 22, 1984
7	A.G. Lamonds. Water resources Reconnaissance of the Ozark Plateaus Province, Northern Arkansas, USGS; Hydrological Investigations, Atlas HA-383. 1972
8	EPA Site Inspection Report, Form 2070-3 prepared by Doice Hughes, ADPCE 3/27/85
9	Removed
10	Removed
11	Final Work Plan, Remedial Investigation/Feasibility Study Arkwood, Inc. Site. Geraghty and Miller, Inc. Dec. 1986
12	Memorandum from Bill Hieber, E&E Fit to Keith Bradley, EPA. January 6, 1986
13	Letters to Doice Hughes, Arkansas Dept. of Pollution Control and Ecology from Charles McLaughlin, McClelland Consulting Engineers Inc., May 26, 1982, August 31, 1982, October 17, 1983, and September 29, 1982
14	Letter to Martha Bodden, MITRE, from Kenneth F. Steele, University of Arkansas, with attachment. November 10, 1987.

John D. Bodden
2/1/89

REFERENCES

If the entire reference is not available for public review in the EPA regional files on this site, indicate where the reference may be found:

Reference Number	Description of the Reference
15	Letter to Martha Bodden, MITRE, from Valarie A. Leidy, U.S. Department of the Interior, with attachments. November 17, 1987.
16	Sampling Reports: Memorandum from Rick Horne E&E, FIT to David Wineman, EPA, August 13, 1987, and Analytical results of samples collected at Cricket Spring , 19 April 1988, ERM-Southwest, Inc.
17	104(e) response letter from C. R. Barker, Mass Merchandisers, Inc. to Lou Barinka, U.S. EPA. January 14, 1986.
18	Inspection log, Kathy Kissick. July 11, 1986

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2/1/89

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Reference Number	Description of the Reference
1	Uncontrolled Hazardous Waste Site Ranking System: A Users Manual. 47 FR 31219-31243, 16 July 1982 (Appendix A, CERCLA).
2	Topographic maps Omaha, Ark-Mo. Quad. 1967, 7.5 min Denver, Ark-Mo. Quad. 1972, 7.5 min Omaha NE, Ark-Mo. Quad. 2966, 7.5 min
3	Letter from Charles McLaughton, McClelland Consulting Engineers, Inc. to Doice Hughes, ADPCE, July 12, 1983
4	ADPCE Inspection Report to Mike Bates from Jay Justice, Nov. 5, 1981
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6	Letter McClelland Consulting Engineers, Inc. To: Doice Hughes, ADPCE: From Charles McLaughlin May 22, 1984
7	A.G. Lamonds. Water resources Reconnaissance of the Ozark Plateaus Province, Northern Arkansas, USGS; Hydrological Investigations, Atlas HA-383. 1972
8	EPA Site Inspection Report, Form 2070-3 prepared by Doice Hughes, ADPCE 3/27/85
9	Record of Communication from Doice Hughes, ADPCE to Tim Perdue, EPA 3/26/85
10	Memo to Doice Hughes, ADPCE to Tim Perdue, EPA Received 4/10/85. Sub Arkwood onsite well and demission of onsite drums

Ref
4/15/85

Reference 2

Topographic maps Omaha, Ark-Mo. Quad. 1967, 7.5 min
Denver, Ark-Mo. Quad. 1972, 7.5 min
Omaha NE, Ark-Mo. Quad. 2966, 7.5 min

UTM GRID AND 1967 MAGNETIC NORTH

ARKANSAS

QUADRANGLE LOCATION

OMAHA, ARK.—MO.
N3622.5—W9307.5/7.5

AMS 7356 I NW—SERIES V884

Reference 3

Letter from Charles McLaughton, McClelland Consulting Engineers, Inc.
to Doice Hughes, ADPCE, July 12, 1983



McCLELLAND CONSULTING ENGINEERS INC.

Environmental and Materials Testing
Civil, Environmental and Chemical Engineering Consulting

Little Rock
JAMES E. McCLELLAND, P.E.
FRED NIELSEN, R.L.S.

FAYETTEVILLE
J.E. McCLELLAND, P.E.
VERNON D. ROWE, P.E.

July 12, 1983

81-161

Mr. Doice Hughes
Arkansas Department of Pollution
Control and Ecology
8001 National Drive
Little Rock, Arkansas 72209

Re: Arkwood
Omaha, Arkansas

Dear Mr. Hughes:

Six water samples were collected near the Arkwood Plant on June 28, 1983. The results of pentachlorophenol analyses on these samples are as follows:

<u>Sample Description</u>	<u>PCP, mg/l</u>
Railroad tunnel spring, south side, near east end	0.03
Spring west of plant, south of county road	10.0
Behren Well No. 2	< 0.00005
Behren Well No. 3	< 0.00005
Run-off	0.87

The well samples have shown continued improvement with no PCP detected in these latest samples. However, during the last two sampling periods, the spring samples have had increased concentration of PCP. While we do not know what caused these increases, we can suggest two possible contributing factors:

Continued -

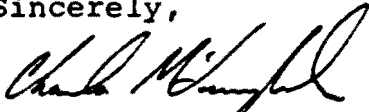
Mr. Doice Hughes
Arkansas Department of Pollution
Control and Ecology

July 12, 1983
Page.....2

(1) heavy rains and higher groundwater flows in the spring months may have "washed out" some of the waste material which had been deposited underground at the plant in years past; and (2) the very low spring flows on June 28th may have provided lower dilution volumes than in the past thereby resulting in higher PCP concentrations.

We plan to continue the sampling program at Arkwood over the next several months and will continue to inform you of the results. Meanwhile, please call if you have any questions.

Sincerely,



Charles McLaughlin, P.E.

CMcL/paa

cc: Mr. Bob Barker
Mr. Devoe Gregory

Reference 4

ADPCE Inspection Report to Mike Bates from Jay Justice, Nov. 5, 1981

ARKANSAS DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY

MEMORANDUM

TO : Mike Bates, Hazardous Waste Inspector, Air and Hazardous Waste
FROM : Jay Justice, Hazardous Waste Chemist, Technical Services JJ
DATE : November 5, 1981

SUBJECT: Results From Analysis of Samples Taken at Arkwood on
October 6, 1981

Steam
discharge

#8 Water

Pentachlorophenol 21 ppm

#4 Water

Pentachlorophenol <0.01 ppm

on site well

#9 Sediment

Pentachlorophenol 5600 ppm

#1 Sediment

Pentachlorophenol 30,000 ppm

on site dump

Walnut
creek

#5 Water

Pentachlorophenol 2.8 ppm

#2 Sediment

Pentachlorophenol 23,000 ppm

on site dump

#6 Water

Pentachlorophenol 3.4 ppm

#3 Water

Pentachlorophenol 18 ppm

discharge pipe

#7 Water

Pentachlorophenol 2.0 ppm

dp

railroad
ditches

Reference 5

Memorandum to Bob Blanz, from Mike Bates October 12, 1981

ARKANSAS DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY

MEMORANDUM

TO: Bob Blanz, Deputy Director

FROM: Mike Bates, Hazardous Waste Inspector MB

DATE: October 12, 1981

SUBJECT: Arkwood, Inc. at Cricket (South of Omaha)

Arkwood, Inc. of Omaha is located on 15-20 acres in Sec. 27 T21NR21W in Boone County, Arkansas. The business consists of a millwork shop, a woodtreating operation using pentachlorophenol and cresote and the storage of the treated wood products before sale.

David Orr of our Fayetteville office received a complaint about "bad looking water coming from a spring inside a railroad tunnel adjacent to the Arkwood property" and made an inspection along with the Boone County Sanitarian, Mike Youngblood on June 19, 1981 (see Attachment "A"). David took three water samples at the railroad tunnel, please refer to attached analysis (Attachment "B").

Arkwood, Inc. notified under RCRA as a generator of hazardous waste. I visited the site on October 5 and 6, 1981, for the purpose of conducting an interim status standards inspection and to follow-up the initial complaint.

Arkwood was founded and originally operated by H. C. Ormand in the early 1960's (approximately 1962). Mr. Ormand leased the process and land to Mass Merchandisers, Inc. of Harrison in the mid 1970's. Mass Merchandisers are the current operators of the site. Their representatives, Bob Barker and Devoe Gregory of the Wood Products Group, supplied the background information for this report during a meeting on October 6, 1981.

The wastes from the wood treating operation, according to Mr. Barker and Mr. Gregory, were dumped into a cave at the treating plant from the beginning of the operation to around 1970 when the cost of the treatment chemicals forced a recovery system to be employed. The cave was covered by boarding the entrance up and covering it with a layer of dirt (the entrance is flush with the ground surface). Currently the wastes consists of the wash down of the treatment room floor and the cleaning of the treatment cylinder between the use of penta and cresote. These wastes are accumulated in a tank and then spread over the storage yard for use as dust control. Mr. Barker estimated they generate approximately 500 gallons/year (6-7000 lbs/year) of these wastes. Steam is also used in the treatment process, the steam is said to be reused in the process, some is bled off to discharge behind the office building adjacent to Missouri Pacific railroad.

Arkwood could be classified as a Small Quantity Generator, according to the generation amounts furnished by Mr. Barker, if they dispose of their waste properly. Arkwood is presently disposing of their waste improperly by spreading the material for dust control and by dumping it in several places at the northeastern end of their property near Highway 65. The frequency of these "dumps" are approximately every three weeks according to a Roy Horn, treatment

MEMORANDUM

Page Two

October 12, 1981

plant manager. The area around the treatment plant is saturated with the treatment chemicals. There are pools of oily material around the treatment cylinder and the storage tanks. The tanks are not diked (with the exception of the raw penta storage tank) nor is there any other type of containment to prevent the washing of the oily substances off-site during rains. The storage yard where the treated wood products are taken to "cure" is saturated in many areas with what appears to be the treatment chemicals leaching from the wood products. Mr. Horn indicated that this saturated soil is scooped out periodically and piled up along the entrance road when the storage areas get too mushy to operate the machinery.

The steam bleed off discharge, as mentioned above, exists on the slope behind the office building. The slope below the discharge pipes is oil stained; at the base of the stained area there is an impoundment which contains a black oily looking liquid. Mr. Horn said that nothing was discharged through the pipes except steam and that nothing had been put in the impoundment for years. The impoundment is approximately 15'X40', depth unknown. There was approximately 2' of freeboard with no evidence of overtopping. The impoundment is located adjacent to the Missouri Pacific railroad and approximately 400' northwest of the railroad tunnel mentioned in the initial complaint.

The tunnel lies in a northwest/southeast line and is approximately 1/2-3/4 of a mile in length. There is a construction crew working on the northwest entrance of the tunnel to widen it. They have been working on the tunnel since the first of the year, the work has reportedly involved a considerable amount of blasting. Gary Benham, with the construction crew, accompanied me into the tunnel on October 5, 1981. There are three springs inside the tunnel; the first of which (approaching from the northwest) is located about halfway through the tunnel on the northern side. The other two are located in the southeast one-third of the tunnel, discharging from the south side of the tunnel. The first two springs discharge through pipes imbedded in the tunnel wall approximately 20-30' above the tracks. The southeastern most spring breaks out near the roof. Mr. Benham stated that the crew complained that the spray from the springs burned their eyes.

The water in the ditches along the tracks was brown in color and had a dark brown to black film on the surface. The tunnel walls and sides of the ditches were oil stained. Both ditches showed signs of contamination, however, the southern ditch appears to be more heavily contaminated.

The southern ditch flows southeasterly from the tunnel for about 1000' before it drops off into a depression formed by the points of two ridges intersecting the railroad. The trees growing in the bottom of this depression had oil stains on them up to 12' above the present level of the water (with oil film). This depression is the receiving point of three drainage patterns (see Attachments "D" and "E"). I did not observe a drainage point out of the depression under the railroad. This depression could possibly be a sinkhole. Mark Witherspoon of our staff agrees with this possibility but indicated that a closer study would be needed to confirm it.

MEMORANDUM

Page Three

October 12, 1981

The northern ditch also flows in a southeasterly direction for about 1000' before turning north and dropping sharply to intersect Walnut Creek on the eastern side of the railroad. The tunnel springs appear to be supplying most of the water in Walnut Creek at the present time. The creek bed is dry approximately 600' downstream from the point where the tunnel spring water intersects the creek. The rocks in the dry bed of Walnut Creek are tinted brown whereas the rocks of an intersecting intermittent stream from the northeast (dry also) are not. This could be an indication of the past flow of contaminants down Walnut Creek.

Nine samples were taken during the inspection. Locations of the samples are shown in Attachments "C" and "D", sample description on Attachment "F". Sample analysis for pentachlorophenol and cresote should be available around October 14th. Numerous photographs were taken and will be furnished when processed. The Arkwood property lies on the Pitkin limestone formation. The contaminated water flows southeast from the railroad tunnel to an area underlain by the Powell Dolomite and the Cotter and Jefferson City Dolomites. These formations are typically intermittently solutionized along jointing patterns. Solutionization may be retarded due to the chert content.

Omaha city water extends along Highway 65 for about one mile south of Arkwood. This according to Ralph Scroggins who owns the house and mobile home at the intersection of Highway 65 and the road leading to Cricket. Mr. Scroggins also said the city lines do not extend off of Highway 65 very far. There are approximately 14 homes which use individual wells as drinking water within a mile radius of Arkwood, assuming that all of the residences within the city limits are on city water and discounting the homes along Highway 65 which should also be on city water.

The Omaha city water supply is a well located in the NE $\frac{1}{4}$, NE $\frac{1}{4}$ Sec. 27T21NR21W, inside the city limits near the Post Office. This well is also within one mile of the site, the total depth of the well is 1315' with a casing depth of 60'. The only water well sample taken was from Arkwood. The depth of the well is unknown, however, Mr. Horn stated that the pump (submergable) was set at 920'.

We have recently received another complaint from a representative of the railroad who charges that a wood treating plant near Cricket is letting liquid wood preservatives out of a holding area and that this material is getting into a railroad tunnel. The complainant also states that railroad people are getting sick from the fumes in the tunnel. This complaint does have some validity to it. There is definitely wood treating chemicals getting into the tunnel, however, as stated earlier I did not observe any discharge or evidence of the overtopping of the dikes of the impoundment below Arkwood. The railroad people may be getting sick from fumes inside the tunnel, but I think the fumes would more likely be coming from the train engine exhausts, especially since the trains have to travel at a slow speed through the tunnel (complainant reports 10 m.p.h.).

The Arkwood wood treating plant is a serious threat to the groundwater and surface water quality in the area. The representatives of Arkwood have voiced their willingness to cooperate and do what is necessary, within their means,

MEMORANDUM

Page Four

October 12, 1981

to alleviate any environmental damage stemming from their operation. There are several things, in my opinion, which should be accomplished.

1. Seal the on-site cave, with concrete or other water tight material, to prevent any contaminates from entering it.
2. Cease the on-site dumping or spreading of wastes from the treating process.
3. Clean-up of all contaminated soil on-site and properly disposal of it.
4. Establish dip pads and runoff containment for the treated wood products storage area.
5. Eliminate any oily discharge and close out or maintain the impoundment according to RCRA (if it contains a hazardous waste).
6. Determine source of contamination inside tunnel and implement measures to correct it.
7. Clean-up all off-site contamination.
8. Sample residential wells in area for presence of contaminants.

Please advise as to what action should be taken.

MB/rlb

cc: Doice Hughes
J.B. Jones



Attachment "A"

STATE OF ARKANSAS
DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY
8001 NATIONAL DRIVE
LITTLE ROCK, ARKANSAS 72209

501-371-1701 GEN OFFICE
501-371-1701 AIR DIVISION
501-371-1701 SOLID WASTE DIV
501-371-1701 WATER DIV
501-371-2130 BUS OFFICE

MEMORANDUM

TO: J. B. Jones
FROM: *ROO* R. David Orr
DATE: July 29, 1981

SUBJECT: Arkwood Preservative Plant near Omaha

At approximately 10:09 a.m. on June 19, 1981, I arrived at Arkwood Preservative Plant near Cricket, approximately 16 miles northwest of Harrison on Highway 65. Accompanying me on the complaint inspection was Mike Youngblood, Boone County Sanitarian, Arkansas Department of Health. At the plant office, we met Mr. Roy Horn, Plant Manager. We told Mr. Horn about the complaint we received ("Bad looking water coming from a spring inside a railroad tunnel adjacent to the Arkwood property"), and told him that we would like a short tour of the treatment process.

Their treatment process involves steam pressure treatment with pentachlorophenol and cresote on a four-day cycle. After treatment, the wood posts are piled in small groups to cure. No means of containment was observed below the piles. There was a level area of "clayish" gravel soil.

Mr. Youngblood and I both observed several pools of blackish water on the property and adjacent to the property along a railroad right of way.

After the tour of the treatment process, we drove along the railroad tracks to a tunnel where a repair crew was repairing tracks. There we met Mr. Gary Benham, Motor Car Operator. We told Mr. Benham why we were there and he said, "I'll show you some bad water on the far side of the tunnel."

Inside the tunnel we observed a spring flowing from the north side which discharged through metal pipes. The water appeared clear. Further inside the tunnel we observed another spring flowing about 30 feet above the tracks. This water appeared somewhat clear but further down the ditch, it formed an oil film on the surface and stained the walls and dirt surfaces. On the east side of the tunnel, we observed more oil film which collected in pools. The drainage flowed off the railroad track right of way into a large pool of water with a thick brownish

Arkwood
July 29, 1981
Page Two

oil film on top. Further study showed this creek to flow into Barren Creek, a tributary to Bull Shoals Lake,

Samples were taken on the east side of the tunnel (Special #1 at 10:45 a.m.), inside tunnel at west end below westside spring on southside (Special #2 at 10:53 a.m.), and at the spring on the north side of the tunnel (Special #3 at 11:01 a.m.). These samples were flown to Little Rock at 5:20 p.m.

I feel that the Arkwood Preservative Plant near Cricket has caused considerable environmental damage. Drinking water in the area and associated tributaries have been contaminated. I feel that this matter should be turned over to the legal section for review, and to the hazardous waste section for future sampling,

Since Bull Shoals Lake is affected, the Missouri Department of Natural Resources should be notified. The Corps of Engineers, Fish and Wildlife Service, and the Arkansas Game and Fish Commission should also be notified,

If I can be of assistance, please feel free to contact me,

RDO;vp

cc: Bob Blanz
Cheryl Terai
Jim Shell
Doice Hughes

ARKANSAS DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY

MEMORANDUM

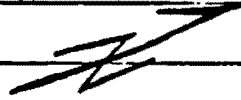
TO : David Orr, Field Inspector, Compliance and T.A. Branch
FROM : Richard Thompson, Chemist Supervisor-Water, Technical Services AT
DATE : June 24, 1981
SUBJECT: Analysis of Samples From ArkWood Wood Treating Plant

The analysis of the samples you submitted on ^{June?} May 20, 1981, has been completed and the results are listed below.

<u>Sample #</u>	<u>Log #</u>	<u>Description</u>	<u>Pentachlorophenol</u>
1	24503	East Side of Tunnel	8.56 mg/l
2	24504	Inside Tunnel At Westend	2.1 mg/l
3	24505		not detected

dp

Arkwood cont. (10/5/81)



Millwork Shop

~~approximate location of~~

deposit of 150,000

if possible

Construction

← P11
P10
↓

07
↓
10
↓

Treated Wood
Product Storage
Area

2.05⁰


house

Mobile Home
[redacted]
worked from R. S.

Hiway 65

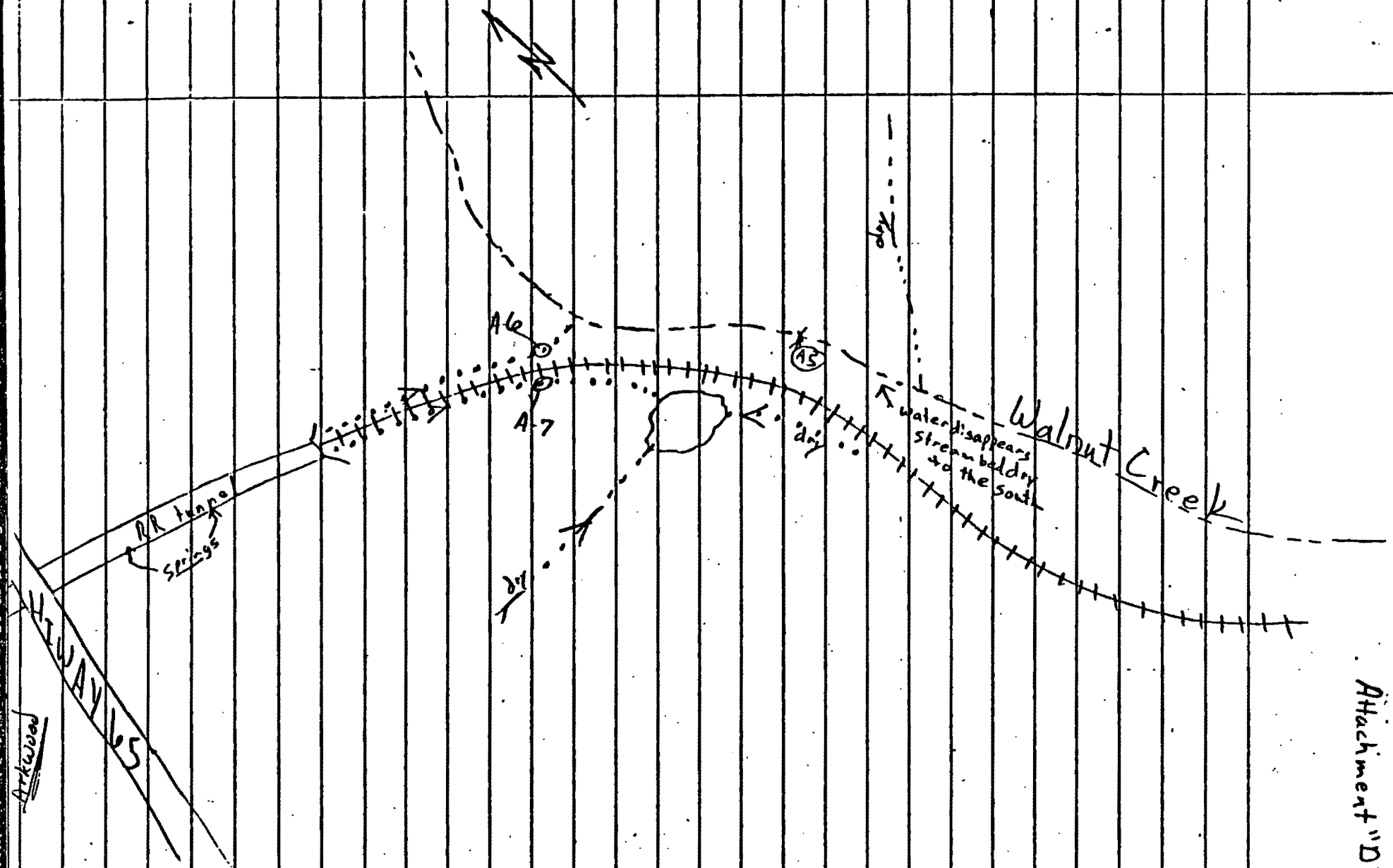
$$-C_2H_5 + H_2O$$

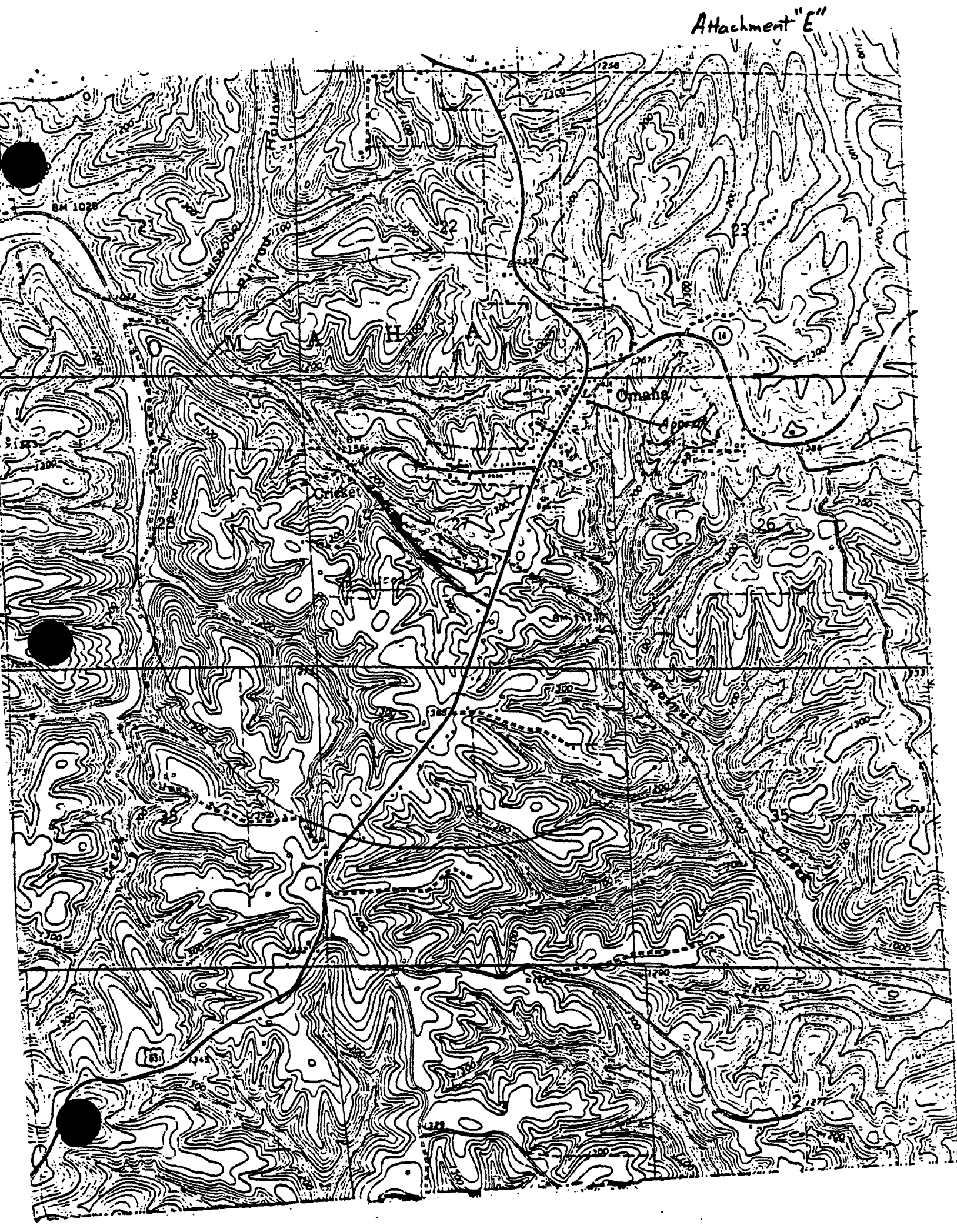
02



12/19/21

2x tunnel





Attachment "F"

Samples Taken During Inspection of Arkwood

<u>Sample #</u>	<u>Description</u>
Arkwood - 1	dump area - saw dust and oily material - black - approximately 350' NW of Highway 65 near NE property line
Arkwood - 2	dump area - sawdust and oil material - black - approximately 100' SW of Arkwood 1
Arkwood - 3 office -	water from drainage pipe leaving property NW of lightbrown - foamy
Arkwood - 4	water from office - (well on site) - pump set at 920'
Arkwood - 5	water from Walnut Creek
Arkwood - 6	North RR ditch (SE of tunnel) where it drops to Walnut Creek - water
Arkwood - 7	South RR ditch directly across from Arkwood - 6 - water
Arkwood - 8	discharge behind Arkwood office - water
Arkwood - 9	SE corner of impoundment below Arkwood - 8 - sediment

SUBJECT: Arkwood, Inc. - Dump point
 LOCATION: Sample pt. #1 (A1), NE corner of
Arkwood, looking West
 CITY: Cricket COUNTY: Boone STATE: AR
 DATE: Oct. 5, 1981 TIME: _____
 WEATHER: (SUN) (HAZE) (CLOUDY) (RAIN) (SNOW)
 PHOTOGRAPHER (Sig.): Mike Bates
 WITNESS: _____
 CAMERA: Minolta 7S 35mm
 FILM TYPE: Kodacolor ASA: 400 T: 1/100 f: Auto
 NEGATIVE LOCATION: ADPC+E FILE #: _____
 PROCESSED BY: KelcoPrint
 PHOTO #: 1 of 19

SUBJECT: Sample pt. #2 (A2)
 LOCATION: Approx. 75' SW of photo #1
Dump point looking SW
 CITY: Cricket COUNTY: Boone STATE: AR
 DATE: Oct. 5, 1981 TIME: _____
 WEATHER: (SUN) (HAZE) (CLOUDY) (RAIN) (SNOW)
 PHOTOGRAPHER (Sig.): Mike Bates
 WITNESS: _____
 CAMERA: Minolta 7S 35mm
 FILM TYPE: Kodacolor ASA: 400 T: 1/100 f: Auto
 NEGATIVE LOCATION: ADPC+E FILE #: _____
 PROCESSED BY: KelcoPrint
 PHOTO #: 2 of 19

SUBJECT: Sample pt. #3 (A3)
 LOCATION: Drainage pipe NW of Arkwood
office
 CITY: Cricket COUNTY: Boone STATE: AR
 DATE: Oct. 5, 1981 TIME: _____
 WEATHER: (SUN) (HAZE) (CLOUDY) (RAIN) (SNOW)
 PHOTOGRAPHER (Sig.): Mike Bates
 WITNESS: _____
 CAMERA: Minolta 7S 35mm
 FILM TYPE: Kodacolor ASA: 400 T: 1/100 f: Auto
 NEGATIVE LOCATION: ADPC+E FILE #: _____
 PROCESSED BY: KelcoPrint
 PHOTO #: 3 of 19



SUBJECT: Drainage ditch down gradient from
LOCATION: sample pt #2 (top left corner of pt 2
looking NNE

CITY: Cricket COUNTY: Bonne STATE: AR

DATE: Oct 5 1981 TIME: _____

WEATHER: [SUM] [HAZE] [CLOUDY] [RAIN] [SNOW]

PHOTOGRAPHER (Sig.) Mike Bates

WITNESS: _____

CAMERA: Minolta 7s 35mm

FILM TYPE: Kodacolor ASA 400 T: 1/125 f: Auto

NEGATIVE LOCATION: ADPC+E FILE #: _____

PROCESSED BY: Kolor Print

PHOTO #: 4 of 19



SUBJECT: Closer view of material in
LOCATION: ditch (photo #4)

CITY: Cricket COUNTY: Bonne STATE: AR

DATE: Oct 5, 1981 TIME: _____

WEATHER: [SUM] [HAZE] [CLOUDY] [RAIN] [SNOW]

PHOTOGRAPHER (Sig.) Mike Bates

WITNESS: _____

CAMERA: Minolta 7s 35mm

FILM TYPE: Kodacolor ASA 400 T: 1/125 f: Auto

NEGATIVE LOCATION: ADPC+E FILE #: _____

PROCESSED BY: Kolor Print

PHOTO #: 5 of 19



SUBJECT: Endpoint of drainage pattern from
LOCATION: photo 4, 5 looking east

CITY: Cricket COUNTY: Bonne STATE: AR

DATE: Oct 5, 1981 TIME: _____

WEATHER: [SUM] [HAZE] [CLOUDY] [RAIN] [SNOW]

PHOTOGRAPHER (Sig.) Mike Bates

WITNESS: _____

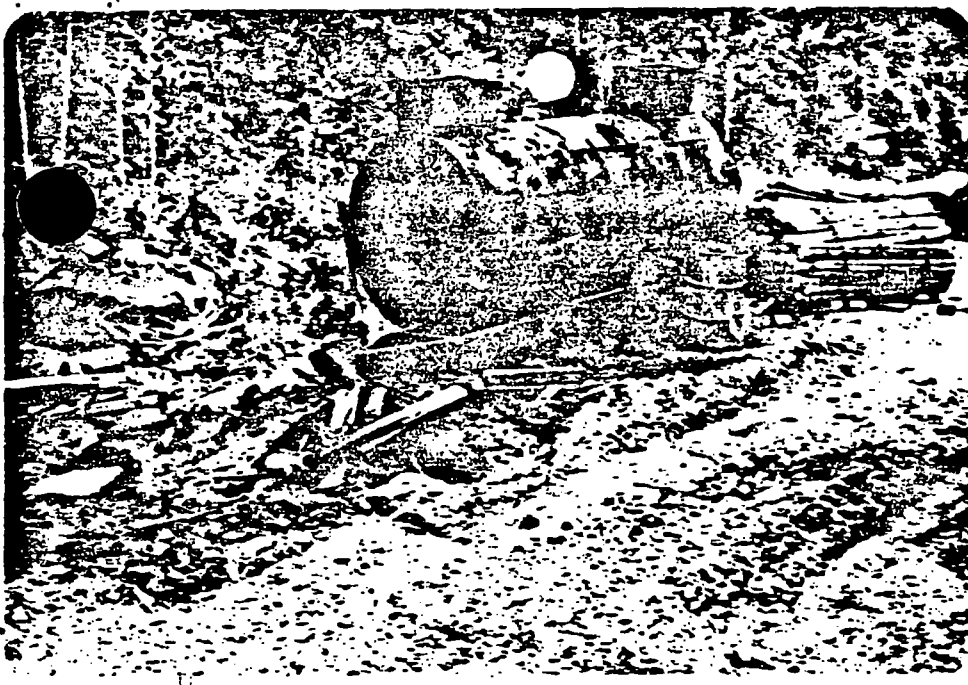
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FILM TYPE: Kodacolor ASA 400 T: 1/125 f: Auto

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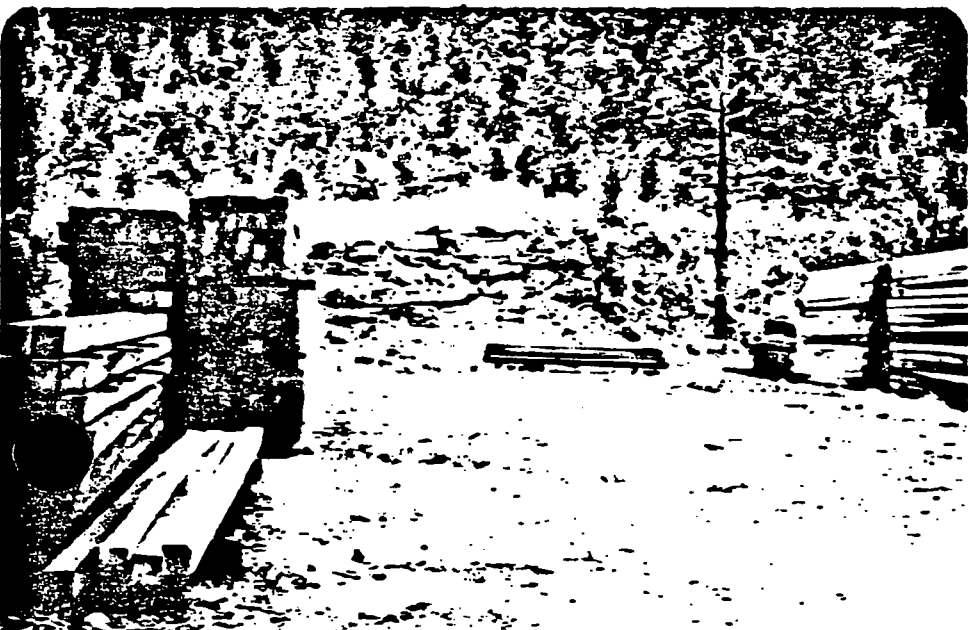
PHOTO #: 6 of 19



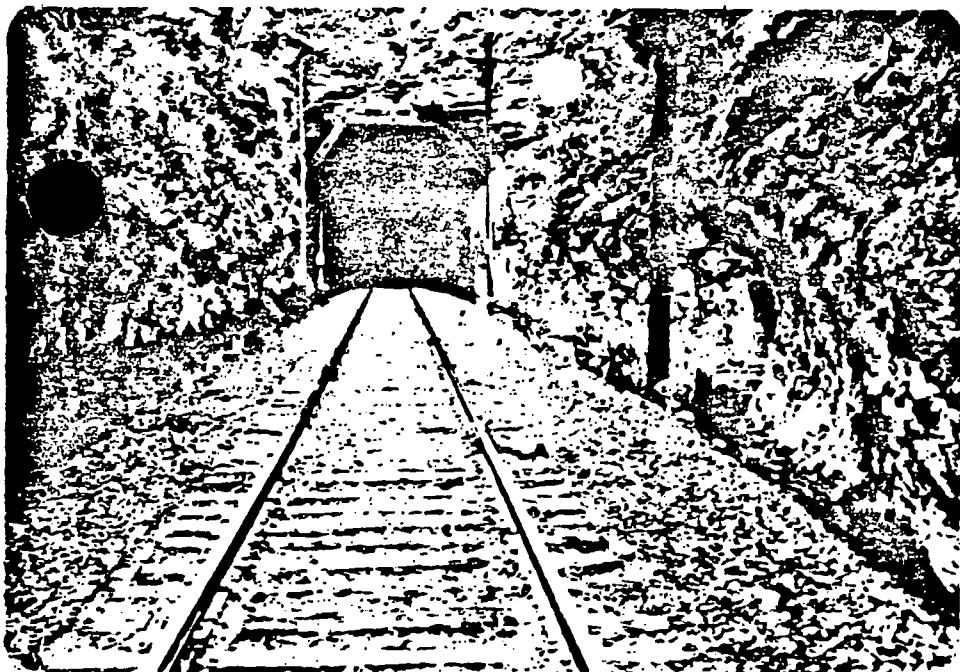
SUBJECT: Tank previously used to haul waste
 LOCATION: From trading plant (Note: center left
of photo - catch basin of photo # 6
 CITY: Cricket COUNTY: Boone STATE: AR
 DATE: Oct. 5, 1981 TIME: _____
 WEATHER: [SUN] [HAZE] [CLOUDY] [RAIN] [SNOW]
 PHOTOGRAPHER (Sig.): Mike Butler
 WITNESS: _____
 CAMERA: Minolta 7s 35mm
 FILM TYPE: Kodakolor ASA 400 T: 1/A f: A
 NEGATIVE LOCATION: ADPC+E FILE #: _____
 PROCESSED BY: Kolor Print
 PHOTO #: 7 of 19



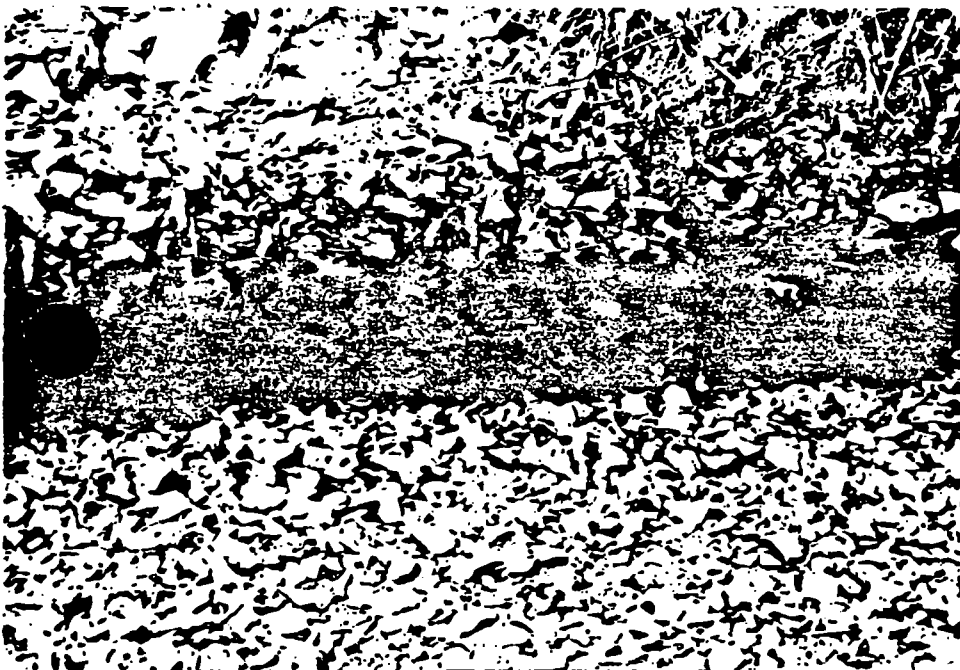
SUBJECT: Soil of hillside - dowl chest
 LOCATION: Southern portion of Arkwood near
County Road, looking SE
 CITY: Cricket COUNTY: Boone STATE: AR
 DATE: Oct. 5, 1981 TIME: _____
 WEATHER: [SUN] [HAZE] [CLOUDY] [RAIN] [SNOW]
 PHOTOGRAPHER (Sig.): Mike Butler
 WITNESS: _____
 CAMERA: Minolta 7s 35mm
 FILM TYPE: Kodakolor ASA 400 T: 1/A f: A
 NEGATIVE LOCATION: ADPC+E FILE #: _____
 PROCESSED BY: Kolor Print
 PHOTO #: 8 of 19



SUBJECT: Outcrop of bedrock (looking SW)
 LOCATION: Adjacent to county road at
southern boundary of Arkwood
 CITY: Cricket COUNTY: Boone STATE: AR
 DATE: Oct. 5, 1981 TIME: _____
 WEATHER: [SUN] [HAZE] [CLOUDY] [RAIN] [SNOW]
 PHOTOGRAPHER (Sig.): Mike Butler
 WITNESS: _____
 CAMERA: Minolta 7s 35mm
 FILM TYPE: Kodakolor ASA 400 T: 1/A f: A
 NEGATIVE LOCATION: ADPC+E FILE #: _____
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 PHOTO #: 9 of 19



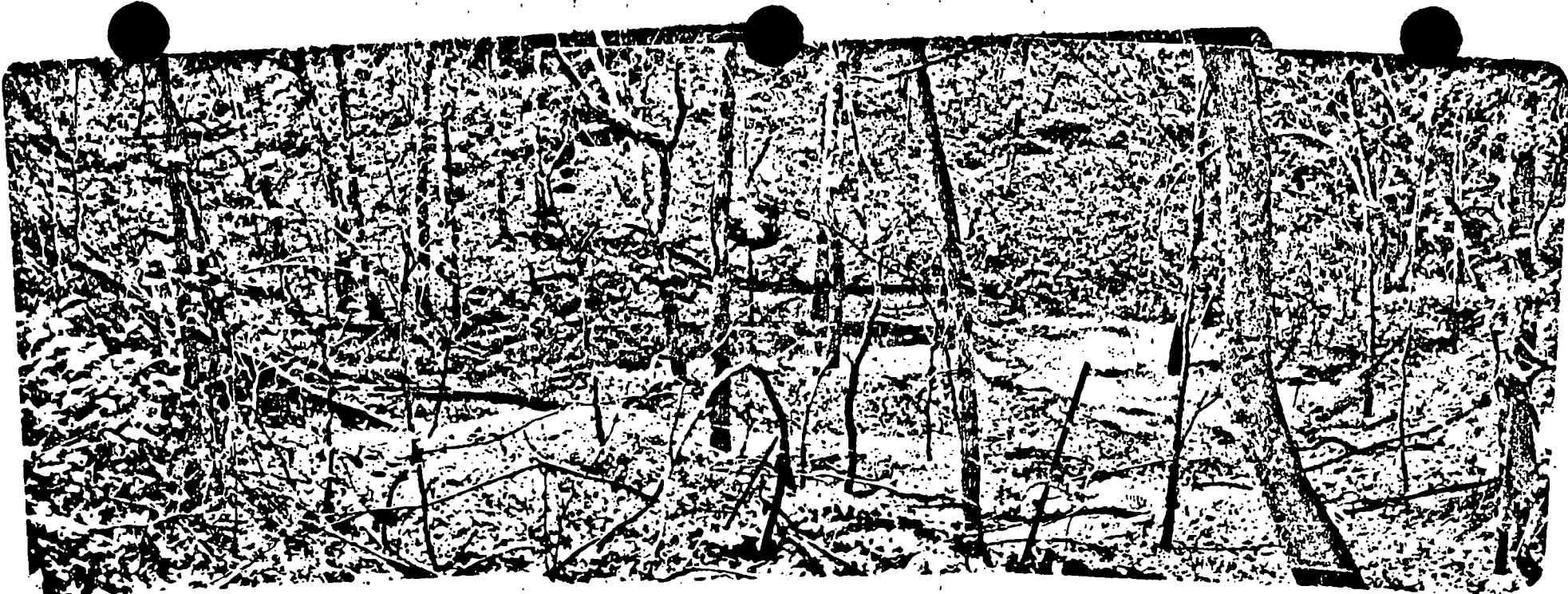
SUBJECT: Southeast entrance to RR tunnel
 LOCATION: Adjacent to Arkwood (Note: disconnection of ditches + water) looking NE
 CITY: Cricket COUNTY: Boone STATE: AR
 DATE: Oct. 6, 1981 TIME: _____
 WEATHER: (SUN) (HAZE) (~~CLOUDY~~) (RAIN) (SNOW)
 PHOTOGRAPHER (Sig.): Mike Butler
 WITNESS: _____
 CAMERA: Minolta 7s 35mm
 FILM TYPE: Kodacolor ASA: 400 T: 1/125 f: Auto
 NEGATIVE LOCATION: ADPct 5 FILE #: _____
 PROCESSED BY: Kolor Print
 PHOTO #: 10 of 19



SUBJECT: RR ditch northern side (right side of RR in photo #10)
 LOCATION: looking NE
 CITY: Cricket COUNTY: Boone STATE: AR
 DATE: Oct. 6, 1981 TIME: _____
 WEATHER: (SUN) (HAZE) (~~CLOUDY~~) (RAIN) (SNOW)
 PHOTOGRAPHER (Sig.): Mike Butler
 WITNESS: _____
 CAMERA: Minolta 7s 35mm
 FILM TYPE: Kodacolor ASA: 400 T: 1/125 f: Auto
 NEGATIVE LOCATION: ADPct 5 FILE #: _____
 PROCESSED BY: Kolor Print
 PHOTO #: 11 of 19



SUBJECT: Southern RR ditch (left side of RR in photo #10)
 LOCATION: looking SW
 CITY: Cricket COUNTY: Boone STATE: AR
 DATE: Oct. 6, 1981 TIME: _____
 WEATHER: (SUN) (HAZE) (~~CLOUDY~~) (RAIN) (SNOW)
 PHOTOGRAPHER (Sig.): Mike Butler
 WITNESS: _____
 CAMERA: Minolta 7s 35mm
 FILM TYPE: Kodacolor ASA: 400 T: 1/125 f: Auto
 NEGATIVE LOCATION: ADPct 5 FILE #: _____
 PROCESSED BY: Kolor Print
 PHOTO #: 12 of 19



Panoramic View - looking South

SUBJECT: End point of drainage from
LOCATION: Seathorn RR ditch (photo #12) -
possible sinkhole - note station on road
CITY: Cricket COUNTY: Boone STATE: AR
DATE: Oct. 6, 1987 TIME: _____
WEATHER: (SUN) (HAZE) (CLOUDY) (RAIN) (SNOW)
PHOTOGRAPHER (Sig.): Mike R. Star
WITNESS: _____
CAMERA: Minox 7s 35mm
FILM TYPE: Kodakcolor ASA: 400 T: 1/1 Auto: Auto
NEGATIVE LOCATION: ADPC+E FILE #: _____
PROCESSED BY: Kolor Print
PHOTO #: 13 of 19



SUBJECT: Nathan RR ditch as it turns
LOCATION: away from tracks - sample
pt # 6(AD) looking SSW
CITY: Cricket COUNTY: Boone STATE: AR
DATE: Oct. 6, 1981 TIME: _____
WEATHER: (SUN) (HAZE) (~~CLOUDY~~) (RAIN) (SNOW)
PHOTOGRAPHER (Sig.) Mike Butler
WITNESS: _____
CAMERA: Minolta 75 35mm
FILM TYPE: Kodacolor ASA: 400 T: 1/ Auto f: Auto
NEGATIVE LOCATION: ADPC+E FILE #: _____
PROCESSED BY: Kolar Point
PHOTO #: 14 of 19

SUBJECT: Impoundment adjacent to RR, below
LOCATION: discharge pipes behind Arkwood
off. # 2, looking east
CITY: Cricket COUNTY: Boone STATE: AR
DATE: Oct. 6, 1981 TIME: _____
WEATHER: (SUN) (HAZE) (~~CLOUDY~~) (RAIN) (SNOW)
PHOTOGRAPHER (Sig.) Mike Butler
WITNESS: _____
CAMERA: Minolta 75 35mm
FILM TYPE: Kodacolor ASA: 400 T: 1/ Auto f: Auto
NEGATIVE LOCATION: ADPC+E FILE #: _____
PROCESSED BY: Kolar Point
PHOTO #: 15 of 19





SUBJECT: Discharge behind Arkwood office
LOCATION: sample pt. # 2 (A-D) (note: stained
slips below pipes) looking south
CITY: Crocket COUNTY: Burns STATE: AR
DATE: Oct. 6, 1981 TIME: _____
WEATHER: [SUN] [HAZE] [CLOUDY] [RAIN] [SNOW]
PHOTOGRAPHER (Sig.) Mike Bates
WITNESS: _____
CAMERA: Minolta 7s 35mm
FILM TYPE: Kodacolor ASA: 400 T: 1/Auto f: Auto
NEGATIVE LOCATION: ADPCE FILE #: _____
PROCESSED BY: Kolor-Print
PHOTO #: 16 of 19



SUBJECT: Truck up stream of sample pt. # 5 (A-S)
LOCATION: dist. discolored water and film
on surface, looking south
CITY: Crocket COUNTY: Burns STATE: AR
DATE: Oct. 6, 1981 TIME: _____
WEATHER: [SUN] [HAZE] [CLOUDY] [RAIN] [SNOW]
PHOTOGRAPHER (Sig.) Mike Bates
WITNESS: _____
CAMERA: Minolta 7s 35mm
FILM TYPE: Kodacolor ASA: 400 T: 1/Auto f: Auto
NEGATIVE LOCATION: ADPCE FILE #: _____
PROCESSED BY: Kolor-Print
PHOTO #: 17 of 19



SUBJECT: Sample pt. # 5 (A-S) - Walnut Creek
LOCATION: looking north
CITY: Crocket COUNTY: Burns STATE: AR
DATE: Oct. 6, 1981 TIME: _____
WEATHER: [SUN] [HAZE] [CLOUDY] [RAIN] [SNOW]
PHOTOGRAPHER (Sig.) Mike Bates
WITNESS: _____
CAMERA: Minolta 7s 35mm
FILM TYPE: Kodacolor ASA: 400 T: 1/Auto f: Auto
NEGATIVE LOCATION: ADPCE FILE #: _____
PROCESSED BY: Kolor-Print
PHOTO #: 18 of 19

(5)

SUBJECT: Ackwood Wood Treating Plant
 LOCATION: _____
 CITY: Cricket COUNTY: Beaver STATE: AR
 DATE: Oct. 6, 1981 TIME: _____
 WEATHER: SUNNY (WAZ) Cloudy (RAIN) (SNOW)
 PHOTOGRAPHER (Sig.): Mike Butler
 WITNESS: _____
 CAMERA: M. J. Smith 7s 35mm
 FILM TYPE: Kodak ASA: 400 T: 1/125 S: Auto
 NEGATIVE LOCATION: ADP 456 FILE #: _____
 PROCESSED BY: Kelce of _____
 PHOTO #: 19

Reference 6

Letter McClelland Consulting Engineers, Inc.
To: Doice Hughes, ADPCE: From Charles McLaughlin
May 22, 1984



McCLELLAND CONSULTING ENGINEERS INC.

Environmental and Materials Testing
Civil, Environmental and Chemical Engineering Consulting

ROCK
JAMES E. McCLELLAND, P.E.
FRED NIELSEN, R.L.S.

FAYETTEVILLE
J.E. McCLELLAND, P.E.
VERNON D. ROWE, P.E.

May 22, 1984

81-161

Mr. Doice Hughes
Arkansas Department of Pollution
Control and Ecology
8001 National Drive
Little Rock, Arkansas 72209

Re: Arkwood
Omaha, Arkansas

Dear Mr. Hughes:

Six water samples were collected near the Arkwood plant on May 11, 1984. The results of pentachlorophenol analyses on these samples are as follows:

<u>Sample Description</u>	<u>PCP, mg/l</u>
Railroad tunnel spring, south side, near east end	0.057
Spring west of plant, south of county road	4.6
Behren Well No. 2	0.00021
Behren Well No. 3	0.00024
Runoff No. 1	4.2
Runoff No. 2	0.85

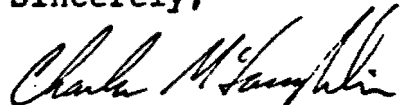
Lt to DH/ADPC&E

Mr. Doice Hughes
Arkansas Department of Pollution
Control and Ecology

May 22, 1984
Page.....2

Please advise if there are any questions at this time.

Sincerely,



Charles McLaughlin, P.E.

CMcL/paa

cc: Mr. Bob Barker
Mr. Devoe Gregory

Lt to DH/ADPC&E

REFERENCES 7

A.G. Lamonds. Water resources Reconnaissance of the Ozarks Plateaus Province, Northern Arkansas, USGS Hydrological Investigation, Atlas HA-383. 1972.

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

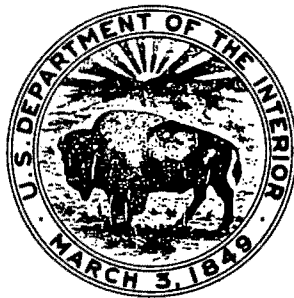
REF 7

PREPARED IN COOPERATION WITH THE
ARKANSAS GEOLOGICAL COMMISSION

**WATER-RESOURCES RECONNAISSANCE OF THE
OZARK PLATEAUS PROVINCE, NORTHERN ARKANSAS**

By
A. G. Lamonds

HYDROLOGIC INVESTIGATIONS
ATLAS HA-383



PUBLISHED BY THE U.S. GEOLOGICAL SURVEY
WASHINGTON, D.C. 20242
1972

WATER-RESOURCES RECONNAISSANCE OF OZARK PLATEAUS PROVINCE, NORTHERN ARK. MAP HA-383

Reference 8

EPA Site Inspection Report, Form 2070-3 prepared by Doice Hughes, ADPCE
3/27/85

100



POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

RECEIVED

1985 APR -8

SITE NUMBER (to be assigned by HQ)

GENERAL INSTRUCTIONS: Complete Sections I and III through XV of this form as completely as possible. Then use the information on this form to develop a Tentative Disposition (Section II). File this form in its entirety in the regional Hazardous Waste Log File. Be sure to include all appropriate Supplemental Reports in the file. Submit a copy of the form to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (EN-335); 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME ARKWOOD PLANT		B. STREET (or other identifier)	
C. CITY Omaha	D. STATE AR	E. ZIP CODE 72662	F. COUNTY NAME Boone
G. SITE OPERATOR INFORMATION 1. NAME Mass Merchandisers, Inc.		2. TELEPHONE NUMBER (501) 741-3425	
3. STREET Box 790	4. CITY Harrison	5. STATE AR	6. ZIP CODE 72601

H. REALTY OWNER INFORMATION (if different from operator of site) 1. NAME Bud Grisham (for H.C. Ormand)		2. TELEPHONE NUMBER (214) 521-9102	
3. CITY #3-C 3525 Turtle Creek Blvd., Dallas	4. STATE TX	5. ZIP CODE 78219	

I. SITE DESCRIPTION PCP wood treating plant				
J. TYPE OF OWNERSHIP <input type="checkbox"/> 1. FEDERAL <input type="checkbox"/> 2. STATE <input type="checkbox"/> 3. COUNTY <input type="checkbox"/> 4. MUNICIPAL <input checked="" type="checkbox"/> 5. PRIVATE				

II. TENTATIVE DISPOSITION (complete this section last)

A. ESTIMATE DATE OF TENTATIVE DISPOSITION (mo., day, & yr.) 10/12/81	B. APPARENT SERIOUSNESS OF PROBLEM <input type="checkbox"/> 1. HIGH <input checked="" type="checkbox"/> 2. MEDIUM <input type="checkbox"/> 3. LOW <input type="checkbox"/> 4. NONE		
C. PREPARER INFORMATION 1. NAME D.L. Hughes			
2. TELEPHONE NUMBER (501) 562-7444		3. DATE (mo., day, & yr.) 3/27/85	

III. INSPECTION INFORMATION

A. PRINCIPAL INSPECTOR INFORMATION 1. NAME Michael Bates		2. TITLE Hazardous Waste Inspector
3. ORGANIZATION Arkansas Dept. of Pollution Control & Ecology		4. TELEPHONE NO. (area code & no.) (501) 562-7444

B. INSPECTION PARTICIPANTS		
1. NAME	2. ORGANIZATION	3. TELEPHONE NO.
Bob Blanz	AR Dept. of Pollution Control & Ecology	(501) 562-7444
Mike Bates	AR Dept. of Pollution Control & Ecology	(501) 562-7444
D. L. Hughes	Ar Dept. of Pollution Control & Ecology	(501) 562-7444

C. SITE REPRESENTATIVES INTERVIEWED (corporate officials, workers, residents)		
1. NAME	2. TITLE & TELEPHONE NO.	3. ADDRESS
Roy Horn	Plant Manager (501) 741-3425	Bx 790, Harrison, AR 72601
Bob Barker	Vice President (501) 741-3425	Bx 790, Harrison, AR 72601
Devoe Gregory	Purchas. Agent (501) 741-3425	Bx 790, Harrison, AR 72601

Continued From Front

III. INSPECTION INFORMATION (continued)			
D. GENERATOR INFORMATION (source of waste)			
1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE GENERATED
Mass Merchandisers	501-741-3425	Bx 790, Harrison, AR 72601	PCP-Creosote
E. TRANSPORTER/HAULER INFORMATION			
1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE TRANSPORTED
N/A			
F. IF WASTE IS PROCESSED ON SITE AND ALSO SHIPPED TO OTHER SITES, IDENTIFY OFF-SITE FACILITIES USED FOR DISPOSAL.			
1. NAME	2. TELEPHONE NO.	3. ADDRESS	
N/A			
G. DATE OF INSPECTION (mo., day, & yr.)	H. TIME OF INSPECTION	I. ACCESS GAINED BY: (operator must be known in all cases)	
10/5/81	9:00 a.m.	<input checked="" type="checkbox"/> 1. PERMISSION <input type="checkbox"/> 2. WARRANT	
J. WEATHER (describe)			
Clear			
IV. SAMPLING INFORMATION			
A. Mark 'X' for the types of samples taken and indicate where they have been sent e.g., regional lab, other EPA lab, contractor, etc. and estimate when the results will be available.			
1. SAMPLE TYPE	2. SAMPLE TAKEN (mark 'X')	3. SAMPLE SENT TO:	4. DATE RESULTS AVAILABLE
1. GROUNDWATER	X	See attached analyses	4/4/85
2. SURFACE WATER	X	See attached analyses	
3. WASTE	X	See attached analyses	
4. AIR			
5. RUNOFF	X	See attached analyses	
6. SPILL			
7. SOIL			
8. VEGETATION			
9. OTHER (specify)			
B. FIELD MEASUREMENTS TAKEN (e.g., radioactivity, oxidizability, PH, etc.)			
1. TYPE	2. LOCATION OF MEASUREMENTS	3. RESULTS	
NONE			

Continued From Page 2

IV. SAMPLING INFORMATION (continued)

C. PHOTOS

1. TYPE OF PHOTOS

☒ a. GROUND ☐ b. AERIAL

2. PHOTOS IN CUSTODY OF:

Mike Bates

D. SITE MAPPED?

☐ YES. SPECIFY LOCATION OF MAPS: Not mapped.

E. COORDINATES

1. LATITUDE (deg.-min.-sec.)

36° 26' 45" North

2. LONGITUDE (deg.-min.-sec.)

93° 12' 0" West

V. SITE INFORMATION

A. SITE STATUS

☐ 1. ACTIVE (Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.)☒ 2. INACTIVE (Those sites which no longer receive wastes.)☐ 3. OTHER (specify):

(Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)

B. IS GENERATOR ON SITE?

☒ 1. NO ☐ 2. YES (specify generator's four-digit SIC Code):

C. AREA OF SITE (in acres)

20

D. ARE THERE BUILDINGS ON THE SITE?

☐ 1. NO ☒ 2. YES (specify): Plant and office buildings.

VI. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

<input checked="" type="checkbox"/> A. TRANSPORTER	<input type="checkbox"/> B. STORER	<input type="checkbox"/> C. TREATER	<input type="checkbox"/> D. DISPOSER
1. RAIL	1. PILE	1. FILTRATION	1. LANDFILL
2. SHIP	2. SURFACE IMPOUNDMENT	2. INCINERATION	2. LANDFARM
3. BARGE	<input checked="" type="checkbox"/> 3. DRUMS	<input checked="" type="checkbox"/> 3. VOLUME REDUCTION	<input checked="" type="checkbox"/> 3. OPEN DUMP
4. TRUCK	<input checked="" type="checkbox"/> 4. TANK, ABOVE GROUND	4. RECYCLING/RECOVERY	<input checked="" type="checkbox"/> 4. SURFACE IMPOUNDMENT
5. PIPELINE	<input checked="" type="checkbox"/> 5. TANK, BELOW GROUND	<input checked="" type="checkbox"/> 5. CHEM./PHYS./TREATMENT	5. MIDNIGHT DUMPING
6. OTHER (specify):	6. OTHER (specify):	6. BIOLOGICAL TREATMENT	6. INCINERATION
		7. WASTE OIL REPROCESSING	<input checked="" type="checkbox"/> 7. UNDERGROUND INJECTION
		8. SOLVENT RECOVERY	<input checked="" type="checkbox"/> 8. OTHER (specify):
		9. OTHER (specify):	Open burning

E. SUPPLEMENTAL REPORTS: If the site falls within any of the categories listed below, Supplemental Reports must be completed. Indicate which Supplemental Reports you have filled out and attached to this form.

☒ 1. STORAGE ☐ 2. INCINERATION ☐ 3. LANDFILL ☒ 4. SURFACE IMPOUNDMENT ☐ 5. DEEP WELL

☒ 6. CHEM/BIO/PHYS TREATMENT ☐ 7. LANDFARM ☐ 8. OPEN DUMP ☐ 9. TRANSPORTER ☐ 10. RECYCLOR/RECLAIMER

VII. WASTE RELATED INFORMATION

A. WASTE TYPE

☒ 1. LIQUID ☒ 2. SOLID ☒ 3. SLUDGE ☐ 4. GAS

B. WASTE CHARACTERISTICS

☐ 1. CORROSIVE ☐ 2. IGNITABLE ☐ 3. RADIOACTIVE ☐ 4. HIGHLY VOLATILE

☒ 5. TOXIC ☐ 6. REACTIVE ☐ 7. INERT ☐ 8. FLAMMABLE

☐ 9. OTHER (specify):

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

NO

Continued From Front

VII. WASTE RELATED INFORMATION (continued)											
2. Estimate the amount (specify unit of measure) of waste by category; mark 'X' to indicate which wastes are present.											
a. SLUDGE		b. OIL		c. SOLVENTS		d. CHEMICALS		e. SOLIDS		f. OTHER	
AMOUNT	UNIT OF MEASURE	AMOUNT	UNIT OF MEASURE	AMOUNT	UNIT OF MEASURE	AMOUNT	UNIT OF MEASURE	AMOUNT	UNIT OF MEASURE	AMOUNT	UNIT OF MEASURE
15	cu. yd.	25,000	gal.					458	cu. yd.	10	cu. yd.
<input checked="" type="checkbox"/> (1) PAINT, PIGMENTS		<input checked="" type="checkbox"/> (1) OILY WASTES		<input checked="" type="checkbox"/> (1) HALOGENATED SOLVENTS		<input checked="" type="checkbox"/> (1) ACIDS		<input checked="" type="checkbox"/> (1) FLYASH		<input checked="" type="checkbox"/> (1) LABORATORY, PHARMACEUT.	
(2) METALS SLUDGES		(2) OTHER (specify):		(2) NON-HALOGENATED SOLVENTS		(2) PICKLING LIQUORS		(2) ASBESTOS		(2) HOSPITAL	
(3) POTW		PCP & Creosote		(3) OTHER (specify):		(3) CAUSTICS		(3) MILLING/MINE TAILINGS		(3) RADIOACTIVE	
(4) ALUMINUM SLUDGE			(4) PESTICIDES		(4) FERROUS SMELTING WASTES		(4) MUNICIPAL				
<input checked="" type="checkbox"/> (5) OTHER (specify):			(5) DYES/INKS		(5) NON-FERROUS SMELTING WASTES		<input checked="" type="checkbox"/> (5) OTHER (specify):				
PCP & Creosote			(6) CYANIDE		PCP & Creosote contaminated soil		PCP & Creosote contaminated sawdust				
			(7) PHENOLS								
		(8) HALOGENS									
		(9) PCB									
				(10) METALS							
				(11) OTHER (specify):							

3. LIST SUBSTANCES OF GREATEST CONCERN WHICH ARE ON THE SITE (place in descending order of hazard)											
1. SUBSTANCE	2. FORM (mark 'X')				3. TOXICITY (mark 'X')				4. CAS NUMBER	5. AMOUNT	6. UNIT
	2.10- LIG	2.10- LIG	2.10- LIG	2.10- LIG	3.1- HIGH	3.2- MED	3.3- LOW	3.4- NONE			
PCP			X		X				SM6300000		
Creosote			X			X			GF8615000		

VIII. HAZARD DESCRIPTION	
FIELD EVALUATION HAZARD DESCRIPTION: Place an 'X' in the box to indicate that the listed hazard exists. Describe the hazard in the space provided.	
<input checked="" type="checkbox"/> A. HUMAN HEALTH HAZARDS PCP was found in the water wells, springs and ditches.	

VIII. HAZARD DESCRIPTION (continued)

☐ B. NON-WORKER INJURY/EXPOSURE☐ C. WORKER INJURY/EXPOSURE☒ D. CONTAMINATION OF WATER SUPPLY

PCP was found in residential water wells.

☐ E. CONTAMINATION OF FOOD CHAIN☒ F. CONTAMINATION OF GROUND WATER

PCP was found in ground water

☒ G. CONTAMINATION OF SURFACE WATER

PCP was found in water from ditches and springs.

VIII. HAZARD DESCRIPTION (continued)

☒ H. DAMAGE TO FLORA/FAUNA

Dead areas were seen at the impoundment at east end of RR tunnel, in ditches, on slope above west RR impoundment.

☐ I. FISH KILL☐ J. CONTAMINATION OF AIR☒ K. NOTICEABLE ODORS

Odors were detected in spring water, at the RR impoundment, in ditches, and at spill-drip areas near pressure tank.

☒ L. CONTAMINATION OF SOIL

Contaminated soil was found at the RR impoundment, at the spill-drip area near pressure tank, across road from west spring, product storage area, and in big impoundment at east end of RR tunnel.

☒ M. PROPERTY DAMAGE

Damage to water wells. Behren's property was purchased by Mass Merchandisers, Inc

VIII. HAZARD DESCRIPTION (continued)

☒ N. FIRE OR EXPLOSION

When oil gathered on top of the west RR impoundment it was set on fire to burn it off.

☒ O. SPILLS/LEAKING CONTAINERS/RUNOFF/STANDING LIQUID

There was spillage and leakage near pressure tank, drip pad areas and in the product storage area. Runoff from plant area contained PCP. There was standing liquid in both RR impoundments.

☐ P. SEWER, STORM DRAIN PROBLEMS☐ Q. EROSION PROBLEMS☒ R. INADEQUATE SECURITY

There is no fence around the impoundments, and fence to plant site is too low to prevent ingress.

☐ S. INCOMPATIBLE WASTES

VIII. HAZARD DESCRIPTION (continued)

☒ T. MIDNIGHT DUMPING

Waste oils and water were dumped into a hole near plant door.

☐ U. OTHER (specify):

IX. POPULATION DIRECTLY AFFECTED BY SITE

A. LOCATION OF POPULATION	B. APPROX. NO. OF PEOPLE AFFECTED	C. APPROX. NO. OF PEOPLE AFFECTED WITHIN UNIT AREA	D. APPROX. NO. OF BUILDINGS AFFECTED	E. DISTANCE TO SITE (specify units)
1. IN RESIDENTIAL AREAS	5	5		400 feet
2. IN COMMERCIAL OR INDUSTRIAL AREAS				
3. IN PUBLICLY TRAVELLED AREAS	100	100		50 feet
4. PUBLIC USE AREAS (parks, schools, etc.)				

X. WATER AND HYDROLOGICAL DATA

A. DEPTH TO GROUNDWATER (specify unit) 150 feet	B. DIRECTION OF FLOW probably westward	C. GROUNDWATER USE IN VICINITY drinking water
D. POTENTIAL YIELD OF AQUIFER 25 gpm	E. DISTANCE TO DRINKING WATER SUPPLY (specify unit of measure) 400 feet	F. DIRECTION TO DRINKING WATER SUPPLY West
G. TYPE OF DRINKING WATER SUPPLY		
<input checked="" type="checkbox"/> 1. NON-COMMUNITY < IS CONNECTIONS _____ <input type="checkbox"/> 2. COMMUNITY (specify town): _____ <input type="checkbox"/> 3. SURFACE WATER <input checked="" type="checkbox"/> 4. WELL		

Continued From Page 8

X. WATER AND HYDROLOGICAL DATA (continued)

4. LIST ALL DRINKING WATER WELLS WITHIN A 1/4 MILE RADIUS OF SITE

1. WELL	2. DEPTH (specify unit)	3. LOCATION (proximity to population/buildings)	4. NON-COM- MUNITY (mark 'X')	5. COMMUN- ITY (mark 'X')
Birmingham old well	78	30' N. old residence	X	
Birmingham old well	805	30' SW of trailer	X	
Binam Behren #1	? 150'	20' south of residence	X X	
Behren #2	420'	500' NW of residence	X	
Behren #3	580'	100' south of residence	X	
Plant well	980'	on plant site.	X	

1. RECEIVING WATER

980' clear

1. NAME

Crickett
Creek☐ 2. SEWERS☐ 3. STREAMS/RIVERS☐ 4. LAKES/RESERVOIRS☐ 5. OTHER (specify):

6. SPECIFY USE AND CLASSIFICATION OF RECEIVING WATERS

Cool water fishery, primary & secondary contact recreation, public water supply,
industrial & agricultural water supply.

XI. SOIL AND VEGETATION DATA

LOCATION OF SITE IS IN:

☐ A. KNOWN FAULT ZONE☒ B. KARST ZONE☐ C. 100 YEAR FLOOD PLAIN☐ D. WETLAND☐ E. A REGULATED FLOODWAY☐ F. CRITICAL HABITAT☒ G. RECHARGE ZONE OR SOLE SOURCE AQUIFER

XII. TYPE OF GEOLOGICAL MATERIAL OBSERVED

Mark 'X' to indicate the type(s) of geological material observed and specify where necessary, the component parts.

A. OVERBURDEN	B. BEDROCK (specify below)	C. OTHER (specify below)
1. SAND	X Limestone	
2. CLAY		
3. GRAVEL		

XIII. SOIL PERMEABILITY

☐ A. UNKNOWN☐ B. VERY HIGH (100,000 to 1000 cm/sec.)☐ C. HIGH (1000 to 10 cm/sec.)☒ D. MODERATE (10 to .1 cm/sec.)☐ E. LOW (.1 to .001 cm/sec.)☐ F. VERY LOW (.001 to .00001 cm/sec.)

G. RECHARGE AREA

☒ 1. YES☐ 2. NO

3. COMMENTS:

H. DISCHARGE AREA

☒ 1. YES☐ 2. NO

3. COMMENTS:

I. SLOPE

1. ESTIMATE % OF SLOPE

4%

2. SPECIFY DIRECTION OF SLOPE, CONDITION OF SLOPE, ETC.

Westward - uniform slope

J. OTHER GEOLOGICAL DATA

See Thomas T. Millard Report.

Continued From Front

XIV. PERMIT INFORMATION

List all applicable permits held by the site and provide the related information.

A. PERMIT TYPE (e.g., RCRA, State NPDES, etc.)	B. ISSUING AGENCY	C. PERMIT NUMBER	D. DATE ISSUED (mo., day, & yr.)	E. EXPIRATION DATE (mo., day, & yr.)	F. IN COMPLIANCE (check "X")		
					1. YES	2. NO	3. UNKNOWN
NO PERMITS ISSUED							

XV. PAST REGULATORY OR ENFORCEMENT ACTIONS

☐ NONE ☒ YES (summarize in the space)

A. O. is in last phase of preparation.

NOTE: Based on the information in Sections III through XV, fill out the Tentative Disposition (Section II) information on the first page of this form.

Reference 9

Record of Communication from Doice Hughes, ADPCE to Tim Perdue, EPA
3/26/85

Removed
2/1/89

Reference 10

Memo from Doice Hughes, ADPCE to Tim Perdue, EPA
Received 4/10/85. Sub. Arkwood onsite well and demissions of onsite dump

*Removed
2/1/89*

Reference 11
Arkwood

FINAL
WORK PLAN
(PRP IMPLEMENTATION)
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
ARKWOOD, INC. SITE
Omaha, Arkansas

December 1, 1986

Prepared by:

GERAGHTY & MILLER, INC.
Ground-Water Consultants
2900 West Fork Drive
Baton Rouge, Louisiana 70827
(504)292-1004

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RArk1/2/aad

SECTION 1 - WORK PLAN SUMMARY

This Work Plan has been developed for the Remedial Investigation and Feasibility Study (RI/FS) at the Arkwood, Inc. site near Omaha, in north central Arkansas. The Arkwood site was the location of a small, single cylinder wood treating plant. The plant was constructed in 1962 and closed in 1984. Mass Merchandisers, Inc. (MMI) operated the plant from 1973 to 1984. In 1981, detectable levels of pentachlorophenol (PCP) were found in two springs and two domestic wells in the immediate vicinity of the plant site. Since 1981, MMI has voluntarily cooperated with the Arkansas Department of Pollution Control & Ecology (ADPC&E) in investigating ground-water conditions beneath and potential sources of contamination emanating from the site.

The Environmental Protection Agency (EPA) Update No. 4 to the National Priorities List added the Arkwood site in late 1985. An Administrative Order on Consent was entered into by EPA and MMI on May 15, 1986. The Consent Order required an RI/FS to be performed at the Arkwood site.

This Work Plan provides a scope of work for the remedial investigation activities at the Arkwood site. The purposes of the remedial investigation are: (1) to determine the nature and extent of the problems at the site; and (2) to gather all necessary data to support the feasibility study. The purpose of the feasibility study is to develop and evaluate remedial alternatives for the site.

This plan has been developed in accordance with the EPA RI/FS guidance documents (References 1 and 2). The approach presented in this Work Plan is consistent with the National Contingency Plan (NCP) requirements to determine the appropriate extent of response and to ensure that remedial measures are cost effective.

1.1 Objectives of the RI/FS

The objective of the remedial investigation is to determine fully the nature and extent of the threat to public health, welfare or the environment caused by the release or threatened release of pollutants from the site. The following primary objectives have been defined for the remedial investigation:

- To characterize the wastes present at the site, including identifying the locations and probable quantities of subsurface wastes through the use of geophysical methods;

- To evaluate the suitability of the site for on-site waste containment;
- To evaluate the hydrogeologic conditions at the site, including identifying all local aquifers and aquitards;
- To determine the horizontal and vertical distribution of ground-water contamination in the aquifers beneath the site;
- To predict the long-term disposition of contaminants present in the ground water;
- To determine the location and extent of contamination of surface and subsurface soils and sediments at the site;
- To determine the extent of contamination of local surface water bodies, including Walnut Creek and Barren Creek; and
- To determine the extent, if any, of atmospheric contamination.

The objective of the feasibility study is to evaluate alternatives for the appropriate extent of remedial action to prevent or mitigate any release or threatened release of pollutants from the site. The following primary objectives have been defined for the feasibility study:

- To identify preliminary remedial technologies appropriate for the site;
- To recommend a cost-effective remedial alternative which effectively mitigates damages to and provides adequate protection of public health, welfare, and the environment; and
- To prepare a conceptual design for the selected remedial action, unless the no-action alternative is selected.

1.2 Scope of Work for the RI/FS

The RI and FS scopes of work described in Sections 2.0 and 3.0 of this Work Plan establish the extent of remedial investigation activities at the site necessary to accomplish the objectives listed above. The information obtained as a result of the RI will be the basis for the determination,

evaluation, and recommendation of a cost-effective remedial alternative during the FS at the site.

The proposed RI/FS for the Arkwood site has been divided into a series of project tasks:

Remedial Investigation

- Task 1 - Description of Current Situation
- Task 2 - Plans and Management
- Task 3 - Site Investigation
- Task 4 - Site Investigation Analysis
- Task 5 - Laboratory and Bench-Scale Studies
- Task 6 - RI Reporting Requirements
- Task 7 - Community Relations Support

Feasibility Study

- Task 8 - Description of Proposed Responses
- Task 9 - Preliminary Identification of Remedial Technologies
- Task 10 - Development of Alternatives
- Task 11 - Initial Screening of Alternatives
- Task 12 - Detailed Evaluation of Alternatives
- Task 13 - Reporting Requirements

1.3 Schedule

The proposed schedule for completing the RI/FS for the Arkwood site is shown in Figure 1-1. This schedule starts at the commencement of remedial activities at the site, after approval of the final Work Plan by the EPA. A detailed schedule of site investigation activities is included as Figure 1-2. This schedule is only an estimate, and is subject to alteration by external factors: weather, unforeseen hydrogeologic findings, and subcontractors.

Figure 1-1 Schedule of Activities

(SEE MAP POCKET)

SECTION 2 - REMEDIAL INVESTIGATION SCOPE OF WORK

The RI for the Arkwood site consists of seven tasks:

- Task 1 - Description of Current Situation
- Task 2 - Plans and Management
- Task 3 - Site Investigation
- Task 4 - Site Investigation Analysis
- Task 5 - Laboratory and Bench-Scale Studies
- Task 6 - RI Reporting Requirements
- Task 7 - Community Relations Support

2.1 Task 1 - Description of Current Situation

2.1.1 Site Background

2.1.1.1 Site Description

The Arkwood site is located west of U.S. Highway 65, one-half mile southwest of Omaha, Boone County, Arkansas, as shown in Figure 2-1. The Arkwood site is located in an excavated area at the head of a valley approximately 1,000 feet west of U.S. Highway 65, as shown in Figure 2-2.

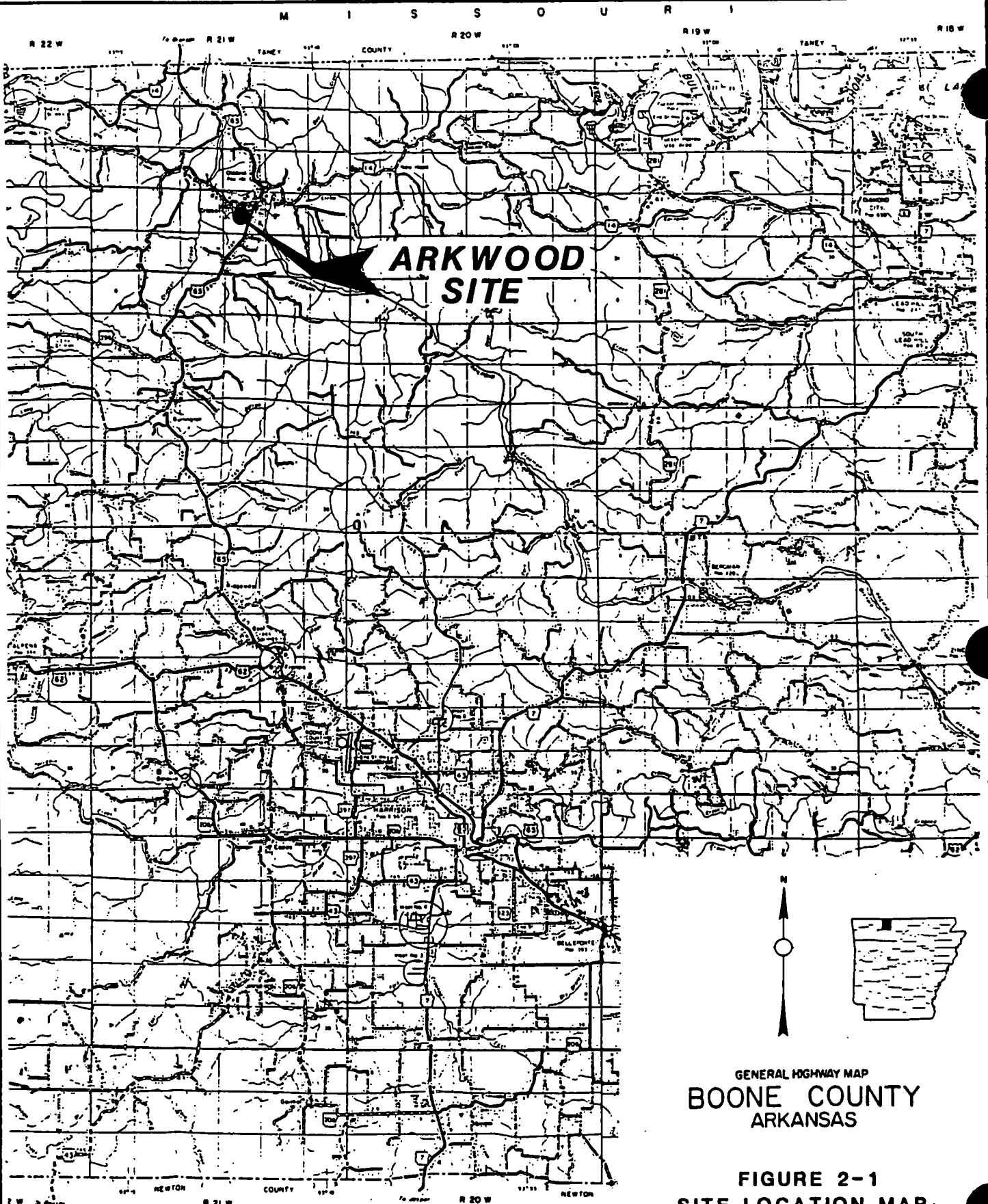
The site covers a total of 15 acres that were used for treating wood and storage of materials. A branch line of the Missouri Pacific Railroad runs across the northern edge of the property. To the south and west the site is bounded by an unpaved road. Highway 65 borders the site to the east. An aerial photograph of the site as it was in February, 1984, is shown in Figure 2-3.

2.1.1.2 Site History

The plant site was developed in the early 1900's when the railroad company excavated to a depth of 40 to 50 feet below natural grade to obtain fill dirt for the construction of the railroad embankment. The Arkwood Plant was built in the 1960's. The assets of Arkwood, Inc. were acquired by MMI in 1973. The land and treating facilities located at the Arkwood plant were leased by MMI from Mr. Ormond. The facility operated from 1973 until the plant ceased treatment operations in June, 1984, at which time MMI sold or removed remaining inventory and process materials. In January, 1985, the 12-year lease expired. A chronology of events is provided in Appendix A.

Mr. Bob Barker was the Arkwood Plant Manager from 1970 to 1973 and General Manager from 1973 to 1984. Mr. Barker is the source of operational information in this document.

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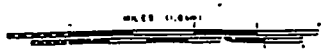
GENERAL HIGHWAY MAP
BOONE COUNTY
 ARKANSAS

FIGURE 2-1
SITE LOCATION MAP
 RI/FS WORK PLAN

ARKWOOD, INC.
 OMAHA, ARKANSAS



PREPARED BY
 ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
 PLANNING DIVISION
 IN COOPERATION WITH
 U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION



2.1.1.3 Site Operations and Practices

Two wood preservative mixtures were used at the site. The original wood preservative used was a mixture of 50% creosote and 50% No. 6 road oil. For the other, pentachlorophenol (PCP) was mixed with wood treating oil (#3 diesel fuel with a suspension additive) to give a 5% wood treating solution (5% PCP and 95% oil). The preservative mixtures were used in the same manner in the wood treatment process. Inorganic arsenical wood preservatives were not used at the site.

The treatment process consisted of a single pressure-cylinder in which the wood was treated. Air was forced into the cylinder to a pressure of 80 pounds per square inch (psi).

The increased pressure opened the wood cells for better penetration and helped push out excess oil at the conclusion of the treating cycle. Under pressure, the wood treating mixture was forced into the cylinder. Once the cylinder was full, pressure treating began.

The amount of wood inside the treating cylinder was calculated in cubic feet. Normal treatment for fence posts, as recommended by the American Wood Preserver's Association (AWPA), is to retain 6 pounds of wood treating mixture for each cubic foot of wood treated. The specific gravity of the wood treating mixture is 7.7 to 7.8 pounds per gallon, depending on temperature. Therefore, for each cubic foot of wood in the treating cylinder, the wood must retain 0.77 gallons of wood treating mixture.

As a rule-of-thumb, the wood would retain the proper amount of treatment mixture when 2 1/2 times the calculated required amount of treating mixture was introduced under pressure in the treatment cylinder. After sufficient time has passed to allow maximum penetration of the treatment chemicals into the wood, the pressure cylinder was drained of preservative and the cylinder was put under a vacuum to draw any excess treatment mixture out of the wood cells. The treatment cylinder was evacuated to a vacuum equal to 25 inches of mercury for a period of 45 minutes to one hour.

The treated materials were then moved from the pressure cylinder and tested for quantity of treatment mixture retained, and the degree of penetration of the wood treatment mixture. The wood was then transported to the yard for storage or shipment. The wood usually had a dry appearance at the end of the treatment process, but some preservative solution may have leached off heavily treated wood as it was transported from the treatment cylinder. This accounts for

the visible discoloration of surface soils around the treatment area.

The treatment room contained a recessed work area (sump) around the treatment cylinder. The recessed area drained into a sump. The sump contained waste from the treatment cylinder, sludge drained from the recessed work area, and water from leaking pipes. The wastes were pumped from the sump into the top of a separation tank east of the treatment room, see Figure 2-4.

Once a week, the treatment room was washed down to remove any oil film or residue on the floor. This wash water drained into the sump and was pumped into a wastewater holding tank. When full, the holding tank was set on a forklift or trailer and emptied as the tank was driven around the yard. This is the source of contamination in the wood chip pile, see Figure 2-4.

During the early years of operation, few precautions were taken to prevent secondary releases of wood treating solutions to the environment. The waste oil was disposed into a sinkhole located near the treating cylinder room. Disposal to the sinkhole was discontinued prior to 1971.

Wastes were disposed in several areas: (1) a sinkhole; (2) the railroad ditch adjacent to the plant; (3) in the ash pile (ashes from a wood-fired boiler located in the treatment room; (4) as surficial contamination in process areas (the trolley tracks leading away from the treatment cylinder); (5) as surficial contamination in areas used to store treated wood products; and (6) in a pile of wood chips.

In 1971, the oil sludge was dumped into a ditch located in the railroad right-of-way (north of the treatment cylinder and treating room), and this area now contains sludges as shown in Figure 2-2. Periodically the oily sludge in the ditch would be burned.

The practice of burning excess waste oil in the railroad ditch was discontinued in 1973. Increasing oil and PCP prices necessitated that more cost-effective methods be used to recover as much of the treatment mixtures as possible. This reduced by 70 to 80% the amounts of waste generated according to Mr. Bob Barker.

Under MMI management, several changes were made in plant operations and waste disposal. The sump drain line was improved to provide for more efficient reuse of oil. The air pressure/vacuum time was increased during treatment process to eliminate/reduce treated wood "bleeding". The sinkhole was cemented over in 1982 with a concrete pad. A concrete

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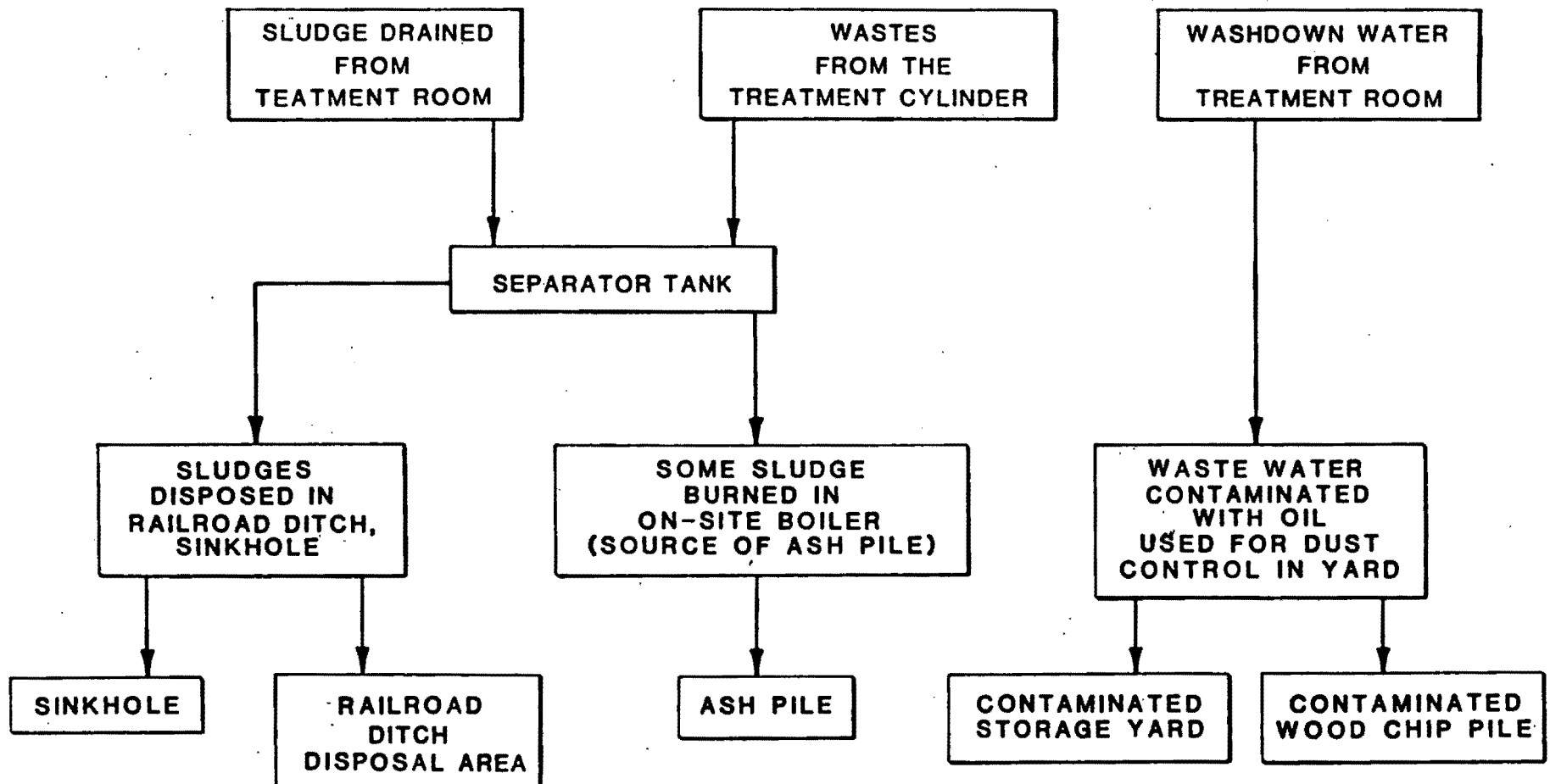


FIGURE 2-4
WASTE STREAMS
 RI/FS WORK PLAN
 ARKWOOD, INC.
 OMAHA, ARKANSAS

berm was added around the storage and separator tanks in the process area. The storage yard was terraced to preclude rain water run-on to process areas.

2.1.1.4 Regional Climatology

The area around the site receives approximately 45 inches of precipitation per year. December, January and February are the driest months. The wettest months are from April to June. Precipitation is generally well distributed throughout the year, as shown in Figure 2-5. Precipitation of a tenth of an inch or more occurs on an average of one day out of five. One or more snowstorms occur every winter, but the snow cover generally does not remain for more than a few days. On average, from 9 to 10 inches of snow falls each season (National Climatic Data Center, Ashville, North Carolina).

The summers are long and warm, with minimum nighttime temperatures in the mid-60's (degrees Fahrenheit). The daytime temperatures reach 100 degrees or higher in most summers, with average daily maximum temperatures in the high 80's and 90's. The winters are generally mild, with the temperatures falling to below zero about once every other year. Daily maximum temperatures have never been as low as 0°. Minimum temperatures of 0° or below in any season do not prevail for more than a few days.

2.1.1.5 Site and Regional Geology

The site is located in rolling pine-covered hills that are characteristic of the Ozark Mountain chain. The surficial cover derived from cherty clay residuum is readily visible from past site excavations. The site is flat, with the area surrounding the site featuring a considerable amount of relief, including a steep drop towards the railroad tracks on the north-eastern edge of the property. Non-commercial land in the area is used primarily for grazing.

Also characteristic of the Ozark Mountains is the "karst" topography and hydrology. Ground-water flow in karst terrain is typically through fractured limestone. These fractures dissolve to create channel flow conditions, accompanied by the creation of sinkholes.

A regional generalized hydrogeologic column for the Omaha, Arkansas, area is provided in Figure 2-6, and provides preliminary descriptions of lithology and estimates for the thicknesses of individual geologic formations. It should be noted that the formations vary in thickness and may be absent within the site area. Figure 2-7 shows a generalized stratigraphic cross-section for the area of the site. Figure

LATITUDE N36 14
LONGITUDE W93 07

CLIMATOLOGICAL SUMMARY

MEANS AND EXTREMES FOR PERIOD 1951-1973

HARRISON, AR
ELEVATION 1170

MONTH	TEMPERATURE (°F)													PRECIPITATION TOTALS (INCHES)														
	MEANS			EXTREMES						MEAN NUMBER OF DAYS				MEAN	GREATEST MONTHLY	YEAR	GREATEST DAILY	YEAR	DAY	SNOW, SLEET						MEAN NUMBER OF DAYS		
										MAX.		MIN.								MEAN	MAXIMUM MONTHLY	YEAR	GREATEST DEPTH	YEAR	DAY	.10 or MORE	.50 or MORE	1.00 or MORE
	90° AND ABOVE	32° AND BELOW	32° AND BELOW	0° AND BELOW																								
					DAILY MAXIMUM	DAILY MINIMUM	MONTHLY	RECORD HIGHEST	YEAR	DAY	RECORD LOWEST	YEAR	DAY															
JAN	48.6	24.9	36.8	78	52	19	-9	68	7	0	4	24	1	2.12	5.68	69	2.74	69	30	3.4	13.0	55	14.0	70	06	4	1	0
FEB	52.7	28.4	40.6	83	72	29	-14	51	2	0	1	19	0	2.68	6.47	56	2.32	57	05	3.9	19.0	69	10.0	69	16	5	2	1
MAR	60.1	35.1	47.6	89	67	13	7	67	7	0	1	14	0	3.62	9.14	73	4.47	64	09	3.2	13.0	70	9.0	70	17	6	2	1
APR	72.1	46.1	59.1	93	63	21	20	57	13	1	0	4	0	4.56	14.01	57	5.11	57	03	.1	2.0	57	2.0	57	12	7	3	1
MAY	79.3	54.0	66.7	94+	53	26	30+	63	1	1	0	0	0	5.22	16.87	61	5.00	61	07	.0						7	4	2
JUN	86.6	62.0	74.3	102+	54	26	42	69	3	10	0	0	0	4.75	10.41	55	3.42	56	16	.0						7	3	2
JULY	90.9	65.9	78.5	110	54	14	46	71	31	19	0	0	0	3.88	8.40	68	4.86	68	02	.0						6	3	1
AUG	90.1	63.9	77.0	106	64	4	43	67	28	17	0	0	0	3.13	7.35	62	2.62	66	16	.0						5	2	1
SEPT	83.6	56.9	70.3	103	54	3	30	67	29	7	0	0	0	3.38	9.55	70	3.03	70	23	.0						5	3	1
OCT	73.6	45.7	59.7	96	54	5	20+	57	28	1	0	3	0	3.41	9.42	67	4.47	69	11	.0						5	2	1
NOV	59.9	35.4	47.7	85	56	11	8	59	17	0	0	12	0	3.48	10.75	68	2.99	59	04	1.3	8.5	51	6.0	58	28	5	2	1
DEC	50.8	28.5	39.7	82	55	24	-6	66	24	0	1	21	0	2.78	8.35	71	4.58	71	10	1.9	13.0	66	13.0	66	24	5	2	1
YEAR	70.7	45.6	58.2	110	JUL 54	14	-14	FEB 51	02	56	7	97	1	43.01	16.87	MAY 61	5.11	APR 57	3	13.8	FEB 19.0	69	JAN 14.0	70	6	67	29	13

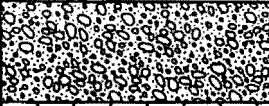







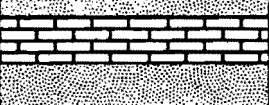

+ ALSO ON EARLIER DATES

FIGURE 2-5
ARKWOOD, INC.
OMAHA, ARKANSAS

GERAGHTY
& MILLER, INC.
Ground-Water Consultants

Figure 2-6

Generalized Geologic and Hydrogeologic Column
RI/FS Work Plan
Arkunor, Inc. Site
Onaha, Arkansas

SYSTEM	SERIES		FORMATION	THICKNESS (ft)	LITHOLOGY	HYDROLOGIC CHARACTERISTICS
QUATERNARY	Pleistocene		Residuum	5-100	Residuum-clay, silt, soil, sand, chert and limestone fragments	
MISSISSIPPIAN	Warsaw Osagian Kinderhookian		Boone	100-400	Gray fossiliferous limestone containing gray chert	Shallow Aquifer System, flows through secondary fractures, joints, and solution channels, commonly yields from 2 to 5 gpm.
			St. Joe Mbr.	50	Gray to pinkish crystalline coarse-textured limestone	
DEVONIAN	Upper Devonian		Chattanooga Shale	0-50	Black fissile clayey shale	May be a possible aquitard (if not too fractured).
			Sylamore Mbr.	0-10	Sandstone which is pebbly and phosphatic	Minor Permeable zone
ORDOVICIAN	Lower Ordovician		Powell	0-200+	Light gray dolomite (magnesian limestone) with limestone conglomerate at base	Upper-Deep Aquifer System, generally yields from 5 to 10 gpm.
			Cotter	500+	Gray dolomite containing some chert nodules, interbedded with some chert and limestone layers	
			Roubidoux	130-445	Dolomite, light-colored, finely granular to medium crystalline; sandy or cherty in part. Sandstone, light-colored, fine to medium grained, angular to rounded grains, loosely to well cemented. Dense and light colored cherts	Lower-Deep Aquifer System, commonly yields 150-300 gpm and may yield as much as 500 gpm.
			Gasconade-Van Buren	320-600	Dolomite which is light-colored, finely granular to medium crystalline, in part wuggy, containing dense cherts	
			Gunter Mbr.	20-100	Sandstone, light-colored, fine to coarse grained, subangular to rounded grained, loosely cemented. Sandy Dolomite	

Stratigraphic nomenclature used in this report based on A. R. Ruddle and H. D. Miser (1914) and W. M. Caplan (1957) and (1960), and hydrologic characteristics used in this report based on A. G. Lamonds (1972).

ARIG/7/crr

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A
NORTHWEST

A'
SOUTHEAST

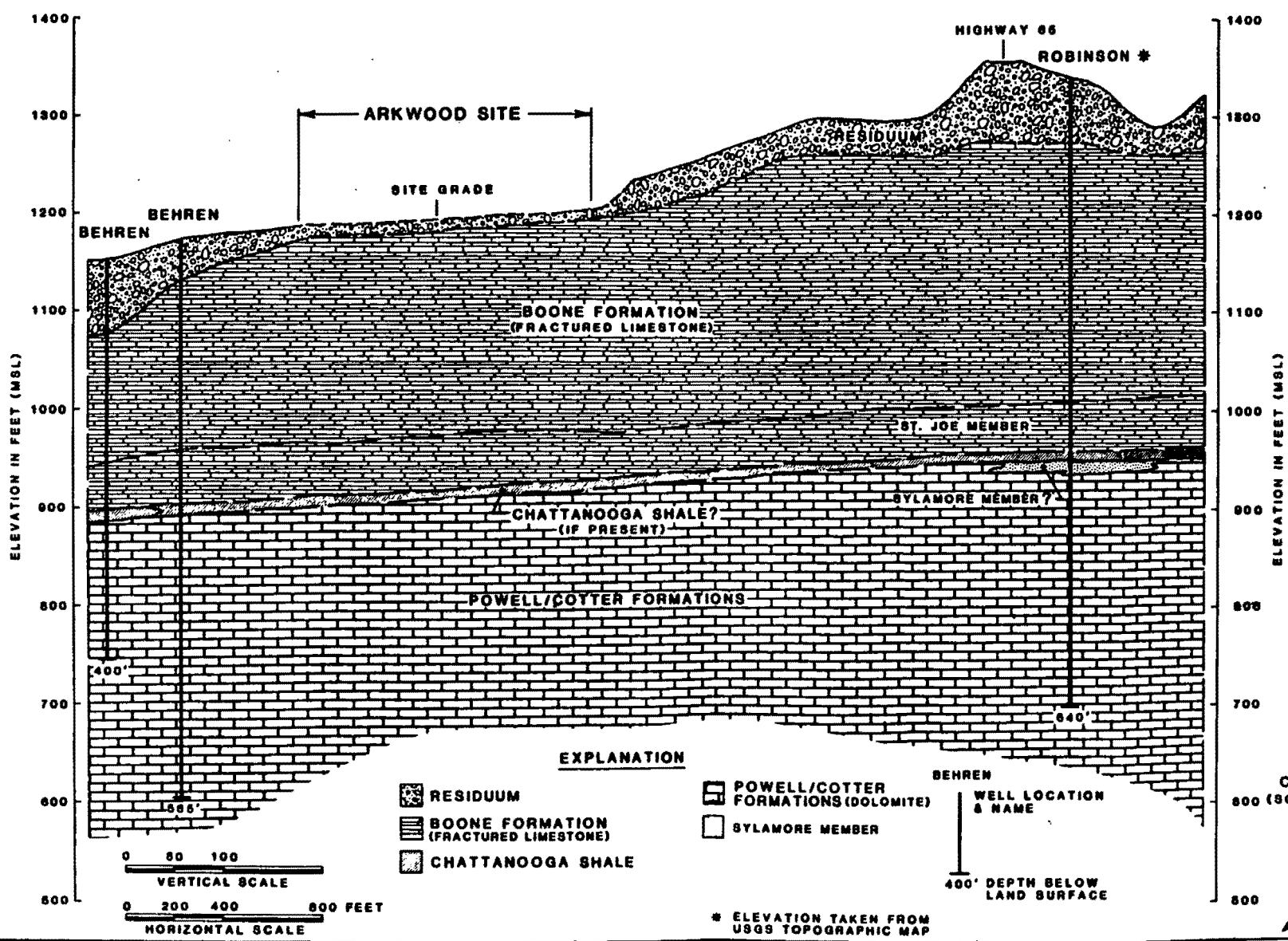


FIGURE 2-7
 PRELIMINARY
 STRATIGRAPHIC
 CROSS-SECTION A-A'
 800 (SOURCE: PURDUE MISER,
 REFERENCE 4)
 RI/FB WORK PLAN
 ARKWOOD, INC.
 OMAHA, ARKANSAS
 GERAGHTY
 & MILLER, INC.
 Ground-Water Consultants

* ELEVATION TAKEN FROM USGS TOPOGRAPHIC MAP

2-8 shows the trace of this cross-section, and indicates which wells were used to develop the cross section.

Figure 2-7 is an hypothetical cross section because conflicting information exists on the elevation of the Chattanooga Shale (if present). This figure represents the hypotheses in which the Chattanooga Shale is around 900 feet above mean sea level in the site area. This hypothesis is based on driller logs and correlated with information in Purdue & Miser (Reference 4, Section 4). On the other hand, according to Mr. O.A. Wise (in a telephone communication October 27, 1986) and to the Arkansas Geological Commission (1960), the Chattanooga Shale would be at a higher elevation and could outcrop in the studied area. This discrepancy will be resolved during the site investigation.

Regionally, the surficial cover is a cherty clay residuum derived from the Boone Formation (correspondence from Tom Millard, September 24, 1982, Appendix B, Summary of Documents). At the site, the surficial materials are classified as cherty silty loams which were partly by-products of the blasting related to railroad construction.

Below the residuum is the Boone formation, which consists of varying amounts of chert and limestone. The thickness of the formation at the site is reported to be approximately 120 ft to 250 ft, excluding the St. Joe Member (Section 4, Reference 4). Limestone in the formation is nearly pure calcium carbonate. The limestones are very soluble in ground water and contain subsurface cracks, joints and fissures. Sinkholes are common where limestone is present at the surface. Many of the large joints and fissures are filled with red clay and boulders. Chert (a very dense, microcrystalline siliceous rock) occurs frequently in the Boone Formation and is the principal rock in the basal section. The distribution of chert in the limestone varies from scattered nodules to sheet-like masses in excess of 100 feet in thickness.

The St. Joe Member of the Boone Formation is regionally one of the most laterally persistent and conspicuous beds present. The thickness of this unit is approximately 50 feet. The rocks of the St. Joe member are composed of crystalline limestone. At the base of the unit, immediately above the Chattanooga Shale (where this formation is present), fractures have been widened extensively by solution (Reference 4, Section 4).

The Devonian-aged Chattanooga Shale may or may not be present in the vicinity of the site. The basal section is generally a black carbonaceous, thinly fissile (tendency to form thin sheets) shale which weathers into flakes. It

DRAWN BY	DAK.	CHECKED BY	PL3	7-3-86	DRAWING NO.	L'070AA 1-A10
DATE	6-28-86	APPROVED BY	NK	1-8-87	REVISED	6

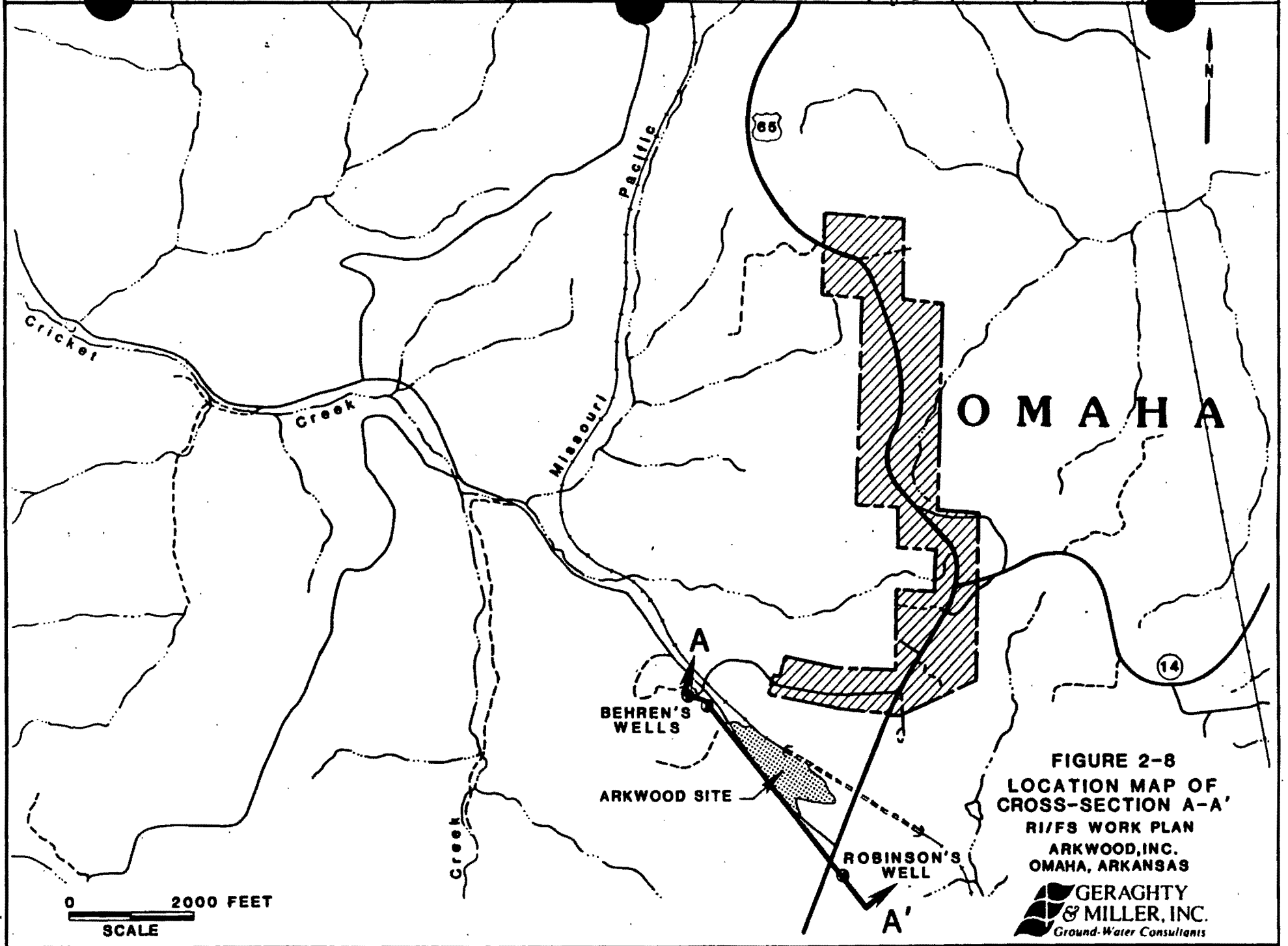


FIGURE 2-8
LOCATION MAP OF
CROSS-SECTION A-A'
RI/FS WORK PLAN
ARKWOOD, INC.
OMAHA, ARKANSAS
GERAGHTY
& MILLER, INC.
 Ground-Water Consultants

contains numerous vertical joints. The upper section is black to brown, with occasional phosphatic sandy streaks. The upper section is less fissile than the basal part and weathers into prismatic blocks irrespective of bedding. Total thickness of the shale varies from 0 to 50 feet. This layer (where present) may act as an aquitard between the Boone Formation and the underlying carbonate units.

Where the lower section of the Chattanooga Shale is absent, the upper section typically overlies the Sylamore member. The Sylamore member is composed of sandstone generally 2 to 5 feet thick and consists of one or more massive (without stratification) beds, although it may be locally thin-bedded.

The Ordovician-aged Powell Formation underlies the Chattanooga Formation. The formation consists primarily of crystalline dolomite, with minor amounts of green, carbonaceous shale containing chert conglomerate. The thickness of the unit ranges from 0 to several hundred feet. The formation weathers rather easily. In the upper part of the formation, numerous veins and masses of sandstone are present. The veins range from approximately 1/2 inch to 6 inches in thickness and extend downward 20 feet from the top of the dolomite. The largest of the masses are 75 feet in diameter and 40 feet in height. Horizontal joints and vertical slickensides (grooved and striated surfaces produced on rocks by movement along a fault) are found at many locations.

The Cotter Formation dolomite underlies the Powell Formation. It contains minor amounts of shale, chert and sandstone. The formation consists of primarily two types of dolomite; a fine-grained, argillaceous (clay containing), relatively soft variety and a more massive medium-grained variety. The two varieties are generally interbedded with thinner layers of sandstone, shale and some chert. The total thickness of this formation is estimated to be more than 500 feet.

The Roubidoux Formation unconformably underlies the Cotter Formation. The Roubidoux consist of dolomite, sandstone and minor amounts of chert. The dolomite is mostly lightly colored, and is finely granular to medium crystalline. Light colored sandstones are present throughout the Roubidoux Formation. The sandstones are composed of loosely to well cemented (siliceous or calcareous cement), fine to medium grained, angular to rounded, frosted quartz grains. Cherts in the formation are generally dense and light-colored, and may be considered representative of the Roubidoux. In northern Arkansas, thickness of the formation ranges between 130 ft and 455 ft. (Section 4, Reference 12).

The Gasconade-Van Buren Formations (underlying the Roubidoux) are undifferentiated in northern Arkansas and will be considered as one unit in this report. The Gasconade-Van Buren Formations (excluding the Gunter member) are generally light-colored, finely granular to medium crystalline, containing light colored dense cherts. The cherts in the lower section occasionally are slightly sandy or contain minor amounts of dolomite. The thickness of this undifferentiated unit ranges between 320 ft and 600 ft.

At the base of the Gasconade-Van Buren unit, the Gunter Member is found. Generally, the Gunter is described as a sandstone which may contain a few thin sandy or silty dolomite beds. (Section 4, Reference 12). The sandstone is loosely cemented by siliceous or calcareous material. Thickness of the Gunter ranges upwards to 40 feet.

2.1.1.6 Site and Regional Hydrogeology

The site surficial clay deposits may be somewhat impervious due to compaction by heavy yard machinery. The vertical coefficient of permeability of a compacted clay sample was measured in the laboratory to be 4.5×10^{-6} cm/sec (September 29, 1982 correspondence from Tom Millard, Appendix B). Permeability of the in-situ material may vary from this value. A very wide range of permeabilities was observed across the site during percolation tests run by Millard. These percolation tests ranged from 2 minutes per inch of infiltration to 8 hours for less than one inch of infiltration.

Below the surficial residuum, the site hydrogeology is believed to be similar to the regional hydrogeology described below.

The Chattanooga Shale, where present, may or may not act as a low permeability layer (aquitard). If the Chattanooga Shale acts as an aquitard, ground water may be present in three aquifer (water bearing) systems: (1) a shallow aquifer system above the Chattanooga Shale; (2) an upper deep aquifer system directly below the Chattanooga Shale; and (3) a lower deep aquifer system. If the Chattanooga Shale is not present or does not act as an aquitard, the ground water may be present in two aquifer systems. These systems have highly heterogeneous vertical permeabilities.

Shallow Aquifer System

The shallow (unconfined) aquifer system consists primarily of deeply weathered cherty limestones of the Boone Formation. The limestone of the Boone Formation has

undergone extensive solution in the Omaha area resulting in what is commonly referred to as "karst" topography and hydrology. Karst topography is characterized by vast numbers of depressions of all sizes, dolines, sinks and other solution features, an almost total lack of surface streams (sinking streams), and large springs in deeper valleys.

Typically, rainfall which is normally mildly acidic, percolates through the carbon dioxide-rich organic soil, further lowering the pH of the infiltrating rainfall. Entering the limestone strata, the moving water enlarges joints and fractures in the bedrock by dissolving the bedrock, producing solution channels along which ground-water flow can occur. The ease by which percolating surface water can move through the unsaturated zone will also increase the potential for ground-water contamination.

Local ground-water patterns (especially in the shallow aquifer system) are difficult to determine because of the nature of karst hydrology. Existing data on the shallow aquifer indicate that local ground-water flow could be either to the west or east as well as downward. In general, depending on the location of recharge and discharge zones, as well as the karst influences, the static water table in the shallow aquifer will follow (in a subdued manner) the topography. Deviations from this general pattern can be expected to be observed during seasonal variations in precipitation.

Deep Aquifer System

The deep aquifer system may be divided into an upper group and a lower group. The upper group would consist of the Powell and Cotter Formations. The lower group would consist of the Roubidoux Formation, the Gasconade Van Buren Formations, and the Gunter Member.

The upper-deep aquifer system consists mainly of limestones and dolomites of the Powell and Cotter Formations. This aquifer system commonly yields 5 to 10 gpm (gallons per minute) from solution channels, bedding planes and fractures (Section 4, Reference 10).

The lower-deep aquifer system consists mainly of sandstones and dolomites of the Roubidoux Formation, the Gasconade Van Buren Formations, and the Gunter Member. Sandstones are generally more productive water-bearing rocks than dolomites. The sandstones of the Roubidoux Formation can average up to 150 gpm and yields of as much as 450 gpm can be obtained from some wells. The Gunter Member is the most productive water-bearing rock of this lower group. Wells that tap this sandstone commonly yield 150 to 300 gpm

and may yield as much as 500 gpm. The Omaha City well appears to be pumping from the lower-deep aquifer system.

Ground-water hydraulic heads in the lower-deep aquifer system could be higher than those in the upper-deep and shallow aquifer systems, (telephone conversation with Mr. Wise of the Arkansas Geological Commission). This head distribution may act to create an upward ground-water flow potential from the deep to the shallow systems. Therefore, even if the Chattanooga Shale is not present or does not act as an aquitard, this head distribution suggests that dissolved contaminants in the shallow aquifer system would be unable to hydraulically migrate to the lower deep aquifer system. However, the lower aquifers could be contaminated by heavier-than-water contaminants coming from shallow aquifers through uncased wells.

2.1.1.7 Site Surface Hydrology

Surface drainage at the site is primarily to the northwest by a tributary of Cricket Creek. Cricket Creek is several thousand feet west of the site and flows in a generally northwesternly direction. Some of the drainage from the site may drain to the east along the railroad tracks into the Walnut Creek basin. Walnut Creek lies approximately 3/4 of a mile to the south and east of U.S. Highway 65, and flows to the southeast. The karst topography present in the area is typified at the site by an absence of perennial surface streams.

2.1.2 Nature and Extent of Problem

2.1.2.1 Types and Amounts of Wastes

The product mix (creosote-treated products versus PCP-treated products) varied from year to year depending upon consumer demand. Both treatment products (PCP-oil mixture and creosote-oil mixture) were used and are the likely source of the oily sludge found in the sinkhole.

Not enough is known about the dimensions of the disposal areas, including the sinkhole, to provide a reliable estimate of the total quantity of wastes disposed. A soil boring drilled at the sinkhole in 1985 showed a four-foot thickness of a multiple-phased liquid, indicating that at least cubic-yard quantities of oily sludge might be present.

From 1970 to 1975, creosote was not used as much as PCP. In 1974, economic considerations prompted a return to treatment of wood products with the creosote preservative mixture. During 1979 and 1980, creosote treatment was done off-site. However, economic considerations once again

prompted a return to treatment of wood products with the creosote treatment mixture.

Data are available for 1981 for the amount of feedstock chemicals purchased. In 1981, the following amounts of primary feedstock chemicals were used: (1) 52,595 gallons of creosote; (2) 217,900 gallons of wood treating oil; and (3) 159,500 pounds of PCP. In that year, Mr. Barker estimated that 500 gallons of waste were generated.

Wastes were disposed of in the sinkhole, railroad ditch and ash pile as described earlier. Other visually contaminated material included debris along the bank. Additionally, liquid wastes (containing the PCP-oil waste mixture) were sprayed on top of the wood chip pile for dust control purposes. Samples were taken from three different locations in the wood chip pile during June, 1985. The analytical results showed PCP to be present in concentrations of 0.5 ppm, 2.1 ppm, and 170 ppm (parts per million).

Measurements of the wood chip pile were taken in late 1985, after all operations at the site had ceased (Appendix I). The sawdust pile has a surface area of approximately 2100 square feet and an average depth of six to nine inches. This results in a total volume for the wood chip pile of less than 60 cubic yards. Additionally, wood chips are scattered about the northeastern corner of the property. The depth and extent of these wood chips have not been determined and will be investigated.

2.1.2.2 Evaluation of Potential Impacts

To evaluate the potential impacts, waste characteristics together with local and regional environmental factors must be considered.

The contaminants at the site are the two types of wood treating compounds, creosote and PCP, put into solution with wood treating oil. These mixtures form the waste products that have been disposed on-site.

Table 2-1 lists organic compounds typically found in wood treating plant wastes where creosote and PCP were used. This table gives relevant physical and chemical properties for each of the major constituents in the creosote and PCP wastes.

Creosote and PCP are sparingly soluble in water (see Table 2-1). The presence of mixtures of these compounds with wood treating oil will result in three-phase contamination. First, there will be a lighter-than-water (floating) phase containing oil, as well as creosote compounds and PCP

TABLE 2-1

Typical Waste Components from Wood Treating Processes
RI/JFS Work Plan
Arkwood, Inc. Site
Omaha, Arkansas

Creosote Wastes:

		Solubility (2)		Vapor Pressure,	
Type		in Water,	Density,	Torr	Log octanal/water
Compound		mg/l	(20 °C)	(20 °C)	Partition Coefficient
Napthalene	PAH	33.1	1.1621	0.0492	3.37
Acenaphthene	PAH	3.42	1.024	0.001 - 0.01	4.33
Fluoranthene	PAH	0.26	1.252	.00001	5.33
Fluorene	PAH	1.84*	1.203	0.001 - 0.01	4.18
Acenaphthylene	PAH	3.93	0.8988	0.001 - 0.01	4.07
Phenanthrene	PAH	1.15	1.182	.00068	4.46
Anthracene	PAH	0.59	1.24	.000195	4.45
Chrysene	PAH	0.002	1.274	10^{-11} - 10^{-6}	5.61
Pyrene	PAH	0.136*	1.271(23)	6.85×10^{-7}	5.32
Benzo (a) anthracene	PAH	.012*	N.A.	5×10^{-9}	5.61

PCP Wastes:

87-Pentachlorophenol	Monocyclic aromatic	14	1.978	0.00011	5.01
80-Toluene	Monocyclic aromatic	535	0.866	28.7	2.69
86-2,4,6-Trichlorophenol	Monocyclic aromatic	800	1.490	1	3.38
85-2,4-Dichlorophenol	Monocyclic aromatic	4500	1.383	0.12	2.75
84-2-Chlorophenol	Monocyclic aromatic	28,500	1.256	2.2	2.17
83-Phenol	Monocyclic aromatic	93,000	1.072	0.59	1.46
90-2,4-Dinitrophenol	Monocyclic aromatic	5,600	1.683	N.A.	1.53
88-2-Nitrophenol	Monocyclic aromatic	2,100	1.495	1 (49.3)	1.76
89-4-nitrophenol	Monocyclic aromatic	16,000	1.270	2.2 (146)	1.91
91-2,4-Dimethylphenol	Monocyclic aromatic	17,000	1.023	0.0621 (20)	2.50
93-4,6-Dinitro-o-cresol	Monocyclic aromatic	N.A.	6.82	N.A.	2.95
92-'p-Chloro-m-cresol	Monocyclic aromatic	3,850	N.A.	N.A.	2.95
71-Benzene	Monocyclic aromatic	1,770*	0.879	95.1	2.04*
78-Ethylbenzene	Monocyclic aromatic	152	0.867	7 (20)	3.15

Notes: * Represent an average of reported values

(1) PAH = Polycyclic Aromatic Hydrocarbons

(2) Temperatures at 25°C unless otherwise noted (also in degrees celcius)

(3) NA = No available data

Source: References 6-8, Section 4

dissolved in the oil. Second, there will be a water soluble phase, which will contain those contaminants that have become dissolved in water. Thirdly, there will be a heavier-than-water (sinking) phase, consisting primarily of the dense, free phase organics (PCP, aromatics associated with creosote compounds), and heavier fractions of the wood treatment oil.

Creosote is a complex mixture of chemical compounds. Creosote is composed of approximately 90% poly-nuclear aromatic (PNA) compounds, including: naphthalene, fluorine-related compounds, acenaphthene, phenanthrene, and flouranthene. The pentachlorophenol was used as a relatively pure compound.

Potential impacts from waste disposal activities may affect ground-water supplies and surface water quality via Cricket Spring Channel (which discharges into Cricket Creek). No data available to date include any impact on Cricket Creek below the confluence with Cricket Spring channel. Additional potential impacts include effects on soils, biota, and ambient air quality.

Several springs and domestic wells, as well as the community water supply well for Omaha, Arkansas, are located within a three-mile radius of the site. In all, approximately 660 persons live within three miles of the site and depend primarily upon ground water from the deep aquifer systems as a source of drinking water.

An inventory of all the registered water supply wells within a three mile radius of the site is provided as Table 2-2. This table gives pertinent construction details of the wells, including well depths. The data has been compiled from all available well completion forms submitted by drilling contractors. No completion data were available for the Arkwood well or the Omaha City Well. All available well completion information will be pursued as far as practicable. The data may be revised as a result of topographic surveying and other data collection activities anticipated to be part of the RI/FS process. All water wells selected for further study will be accurately located during surveying activities related to the site.

2.1.3 History of Response Actions

Since cessation of site operations, there have been a considerable number of investigative activities to determine the impact of the site on the surrounding environment. These activities have included: waste characterization; sampling of springs; and sampling of wells in the area that showed past evidence of having been impacted by site operations.

TABLE 2-2

Water Well Inventory and Construction Details
of Wells Within Three Mile Radius of the
Arkwood Plant, Omaha, Arkansas

Well Owner	Use of Well	Date Well Completed	Depth Interval of Water Producing formation (ft)	Type of Formation	Depth to Water (ft-bls)	Total Depth of Well (ft-bls)
Omaha City Well	Municipal			Dolomite		2100
John Atchison	Domestic	09-08-80	780 - 785	Limestone	400	795
Frank Atchison	Domestic	09-08-78	525 - 530	Limestone	380	550
Robert Behrens	Domestic	07-17-82	274 - 274.5	Limestone	240	565
Robert Behrens	Domestic	01-26-80	280 - 300	Limestone	350	400
Robert Behrens-abandoned	Domestic	01-26-80	280 - 300	Limestone	350	496
Dean Curhow	Domestic	10-20-78	664 - 670	Limestone	410	775
Mildred Davidson	Domestic	10-20-78	660 - 665	Limestone	---	687
Bud Essary	Domestic	07-15-76	210 - 215	Limestone	160	300
Bud Essary	Domestic	07-20-81	640 - 650	Limestone	300	688
Clifford Ford	Domestic	10-02-75	384 - 385	Limestone	250	415
Clinton Hicks	Domestic	09-18-72	470 - 480	Limestone	360	650
John Huston	Domestic	12-10-79	441 - 445	Limestone	350	496
Fernam Jones	Domestic	03-15-79	520 - 530	Limestone	450	550
Norman Klasener	Domestic	10-30-77	450 - 470	Sandstone	375	505
James Lovell	Domestic	11-20-74	400 - 440	Limestone	300	480
Leonard Matlock	Domestic	08-20-76	645 - 690	Sandstone	430	705
McGinnis	Domestic	07-29-75	593 - 594	Limestone	400	610
Charles McMahon, Jr.	Domestic	06-15-77	348 - 352	Limestone	---	412
Don Moore	Domestic	07-28-75	519.5 - 520	Limestone	350	550
New Hope Baptist Church	Domestic	05-17-71	190 - 195	Sandstone	330	555
Nelson Rice	Domestic	09-74	-----	-----	---	783
Sid Richardson	Domestic	01-08-77	770 - 772	Limestone	375	775
John Robinson*	Domestic	07-15-73	600 - 610	Limestone	480	640
T. C. Sallee	Domestic	08-01-73	580 - 690	Limestone	430	710
Cam Tong	Domestic	05-17-71	725 - 730	Limestone	380	735
John Wood, Sr.	Domestic	02-23-73	145 - 253	Limestone	---	253
Nelson Rice	Domestic	09-74	-----	-----	---	783
Omaha School Well	Domestic	----	-----	-----	---	---
Cathy Duggan	Domestic	----	-----	-----	---	---
Binam	Domestic	----	-----	-----	---	---
Birmingham	Domestic	----	-----	-----	---	---
Birmingham-abandoned	Domestic	----	-----	-----	---	---
David Miles	Domestic	----	-----	-----	---	---
O.C. White	Domestic	----	-----	-----	---	---
O.C. White	Domestic	----	-----	-----	---	---
Tate	Domestic	----	-----	-----	---	---
Arkwood Inc.	Industrial	----	-----	-----	---	---
House w/Satellite Dish	Domestic	----	-----	-----	---	---
Turney	Domestic	----	-----	-----	---	---

* Replacement Well

Ark/4/aad

A summary of the reference documents reviewed while preparing this summary of enforcement actions is included as Appendix B. Figures showing the sampling locations used for all sampling events on-site and off-site have been included as Figures 2-9 and 2-10, respectively. The locations for each sampling point have been numbered and identified by name. The site locations are listed by number and name in the tables that present the relevant data.

The Arkwood site was the subject of an inspection on May 19, 1981, by a representative of the ADPC&E and the Boone County Sanitarian. The inspection resulted from a complaint filed with the ADPC&E concerning contamination in the railroad tunnel adjacent to the property.

In October, 1981, MMI retained McClelland Consulting Engineers (MCE) to assist MMI in bringing the Arkwood site into compliance. MCE began the collection of ground-water quality data relating specifically to the site. Monthly ground-water sampling was initiated in May, 1982, together with new operating procedures to reduce the quantity of oil, creosote, and PCP being released to the environment.

Sampling performed by MCE, presented in Appendix C for informational purposes only, indicated that contamination of the ground water by PCP had occurred. The contamination was found off-site in Cricket Spring channel west of the plant, in domestic water supply wells, and in a spring to the east inside the railroad tunnel. No data from MCE were available to verify the quality assurance procedures used by either the field personnel collecting the samples or the laboratory used to analyze the samples. These data must, therefore, be considered preliminary.

In July, 1982, Thomas Millard, an independent consultant, was retained to make a preliminary assessment of the site-specific geology as well as the direction of the ground-water flow. Mr. Millard issued a rough draft report briefly describing the site-specific geology (July 2, 1982, correspondence from Thomas Millard, Appendix B), as well as stating that the ground-water flow is predominately to the west, following the regional dip of the outcropping limestone.

On October 22, 1981, representatives from the Arkwood plant met in Little Rock with the ADPC&E and a representative from MCE. The outcome of the meeting was that a plan to study the problem was to be developed by MMI and MCE. The plan was to: (1) outline the problem areas; (2) propose a plan of action to correct the problem; and (3) contain a

schedule of activities for implementing the identified corrective actions. This schedule was submitted to ADPC&E in December, 1981.

In May, 1982, MCE submitted a report to ADPC&E outlining the improved procedures in use, as previously discussed. Improvements implemented in August, 1982, to the facilities included: (1) pouring a concrete pad over the sinkhole; (2) constructing a concrete drip pad in front of the treating cylinder; and (3) grading the area around the drip pad to preclude rainfall runoff from entering the process area.

In the summer of 1982, MMI had a new water supply well drilled for Mr. Behrens, to replace the well that had shown contamination by PCP during earlier sampling events by MCE. The well completion report was forwarded to ADPC&E in September, 1982. The only action at the site was continued ground and surface water sampling by MCE for the remainder of 1982, all of 1983, and the first several months of 1984.

Monthly sampling events by MCE continued at the site until January, 1985. All the analytical data generated by these and subsequent sampling events have been given to the ADPC&E.

In February of 1985 Geraghty & Miller, Inc. (G&M) was retained by MMI to conduct a preliminary hydrogeologic investigation of the Arkwood site. The investigation consisted of: (1) water quality sampling of wells, springs and streams; and (2) soil borings in the plant site. Soil boring locations were selected and boring was attempted using hand-held augers. The results of these borings were of limited effectiveness due to the extreme difficulty of sampling with a hand-held auger in soils characterized by clays and chert. Water samples were collected from a large number of wells in the vicinity, and the elevations of the measuring points were surveyed. The investigation was carried out in April, 1985. The analytical results were deemed not valid and were not reported by the laboratory, as the samples were not analyzed by the laboratory within holding time constraints.

In May, 1985, sampling at the site was conducted by McKesson Environmental Services, Inc. (MES). The samples were analyzed for organic priority pollutants. The data from this sampling event has been included as part of Table 2-3. This was the first sampling event that including sampling and analysis of sludges, ground and surface water for other than PCP content. Analyses included PCP, polynuclear aromatics (PNA), chlorinated volatile organic compounds (VOA-CL), and volatile aromatic compounds (VOA-AR).

TABLE 2-3

Analytical Data from Samples Collected by McKesson Environmental Services
RI/FS Work Plan
Arkwood, Inc. Site, Tuba, Arkansas

Data Sampled	Location Number	Figure Number	Sampling Location	Sample Description	Analyses Performed	Results (ppm)				Others
						PCP	PNA	VOA-C1 Compounds	VOA-ARD Compounds	
05-20-85	18	2-10	Spring Through Railroad Culvert	MES# 22452	EPA 610(HPLC)	<0.005	<0.005	N/A	N/A	
05-20-85	6	2-10	Miles Well	Matrix: Water MES# 22453	EPA 604(GC) EPA 624(GC/MS)	<0.005	<0.005	<0.005	<0.005	
				Matrix: Water	EPA 625(GC/MS) EPA 610					
05-20-85	3	2-10	Behren Well, In Use	MES# 22454	EPA 610	N/A	<0.005	N/A	N/A	
05-20-85	10	2-10	Omahe City Well	Matrix: Water MES# 22455	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
				Matrix: Water	EPA 610					
05-20-85	8	2-10	Birmingham-New Well	MPS# 22456	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
				Matrix: Water	EPA 610					
05-20-85	1	2-10	Cricket Spring	MES# 22457	EPA 624 EPA 625	1.9	<0.005	<0.005	<0.005	
				Matrix: Water	EPA 610					
05-20-85	5	2-10	Canning Factory Spring	MES# 22458	EPA 610	N/A	<0.005	N/A	N/A	
				Matrix: Water						
05-20-85	4	2-10	Railroad Tunnel Spring, South Side	MES# 22459	EPA 610	<0.005	<0.005	N/A	N/A	
				Matrix: Water	EPA 604					
05-20-85	20	2-10	Duggan Well	MPS# 22460	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
				Matrix: Water	EPA 610					
5-21-85	22	2-9	Railroad Ditch Disposal Area, Standing Water	MES# 22461	EPA 624 EPA 625	<0.005	Total 3.4	<0.005	<0.005	
				Matrix: Liquid	EPA 610					
5-21-85	7	2-10	Birmingham-Old Well	MES# 22463	EPA 624 EPA 625	<0.005	Naphthalene 0.026 Fluorene 0.031	<0.005	<0.005	
				Matrix: Water						
5-21-86	9	2-10	Binas Well	MES# 22466	EPA 610	N/A	<0.005	N/A	N/A	
				Matrix: Water						
5-21-85	21	2-9	Arkwood Well	MES# 22467	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
				Matrix: Water						
5-21-85	22	2-9	Railroad Ditch Disposal Area	MES# 22468	EPA 624 EPA 625	10,400	Total 4000	☐	☐	
				Matrix: Waste						
5-21-85	16	2-9	Soil In Yard between Product and Water Tank	MES# 22464	EPA 8250 for PCP only	8200	N/A	N/A	N/A	
				Matrix: Soil, Discrete						
06-3-85	11	2-9	B-1 Concrete Pad Boring, 1.5' b/s	MES# 22833	EPA 8340 EPA 8270	7000	Total 1660	☐	41	
				Matrix: Soil, Discrete						
06-03-85	11	2-9	Sinkhole Fluid	MES# 22834	EPA 8240 EPA 8270	200	Total 131	<0.05	2.3	
				Matrix: Waste Water						
06-03-85	12	2-9	B-2, 3' b/s Near Concrete Pad	MES# 22835	EPA 8250 for PCP only	56	<20	N/A	N/A	
				Matrix: Soil, Discrete	EPA 8270					
06-3-85	13	2-9	B-3, 5' b/s	MES# 22839	EPA 8270	830	200	N/A	N/A	
				Matrix: Soil, Discrete						
06-4-85	4	2-10	Railroad Tunnel Spring, South Side	MES# 22828	EPA 625	<0.005	<0.005	N/A	N/A	
				Matrix: Water						
06-4-85	1	2-10	Cricket Spring	MES# 22829	EPA 625	4.5	<0.005	N/A	N/A	
				Matrix: Water						
06-4-85	13	2-9	B-3, 20' b/s	MES# 22842	EPA 8270	<20	<20	N/A	N/A	
				Matrix: Soil, Discrete						
06-4-85	14	2-9	B-4, 2' b/s Wood Chip Pile	MES# 22843	EPA 8250 for PCP only	1.1	N/A	N/A	N/A	
				Matrix: Soil, Discrete						
06-5-85	9	2-10	Binas Well	MES# 22830	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
				Matrix: Water						
06-5-85	7	2-10	Birmingham-Old Well	MES# 22831	EPA 624 EPA 625	<0.005	Total 0.023	<0.005	<0.005	
				Matrix: Water						
06-5-85	8	2-10	Birmingham-New Well	MES# 22832	EPA 624	N/A	N/A	Total 0.037	<0.005	
				Matrix: Water						
06-5-85	14	2-9	B-4, 3.5' b/s Wood Chip Pile	MES# 22844	EPA 8270	<20	<20	N/A	N/A	
				Matrix: Soil, Discrete						
10-16-85	23	2-9	Ash Pile	MES# 851049-1	EPA 8240 EPA 8270	2600	550	<0.5	<0.05	
				Matrix: Soil, Discrete						
11-25-85	7	2-10	Birmingham-Old Well	MES# 851186-1	EPA 624 EPA 625	<0.005	Total 0.005	<0.005	<0.005	
				Matrix: Water						
11-25-85	6	2-10	Miles Well	MES# 851186-2	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
				Matrix: Water						

TABLE 2-3 (Continued)

Analytical Data from Samples Collected by McKeon Environmental Services
RI/FS Work Plan
Arkwood, Inc. Site, Omaha, Arkansas

Date Sampled	Location Number	Figure Number	Sampling Location	Sample Description	Analyses Performed	Results (ppm)				
						PCP	PMA	VOA-CI Compounds	VOA-Aro Compounds	Others
11-25-85	8	2-10	Birmingham New Well	MES# 851186-3 Matrix: Water	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
11-25-85	5	2-10	Canning Factory Spring	MES# 851186-4 Matrix: Water	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
11-25-85	4	2-10	Railroad Tunnel Spring, South Side	MES# 851186-5 Matrix: Water	EPA 624 EPA 625	0.11	<0.005	<0.005	<0.005	
11-25-85	1	2-10	Cricket Spring	MES# 851186-6 Matrix: Water	EPA 624 EPA 625	1.8	Total 0.028	<0.005	<0.005	
11-25-85	10	2-10	Omaha City Well	MES# 851186-7 Matrix: Water	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
11-25-85	2	2-10	Behren (Clatern) Well	MES# 851186-8 Matrix: Water	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
11-25-85	3	2-10	Behren (In-Use) Well	MES# 851186-9 Matrix: Water	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
12-05-85	21	2-9	Arkwood Well	MES# 851221-1 Matrix: Water	EPA 625	<0.005	<0.005	N/A	N/A	
12-11-85	4	2-10	Railroad Tunnel Spring, South Side	MES# 851251-1 Matrix: Water	EPA 625	<0.005	<0.005	N/A	N/A	
04-86	10	2-10	Omaha City Well	MES# 860340-1 Matrix: Water	EPA 625	<0.005	<0.005	N/A	N/A	
04-86	9	2-10	Rincon Well	MES# 860340-2 Matrix: Water	EPA 625	<0.005	<0.005	N/A	N/A	
04-86	3	2-10	Behren Well	MES# 860340-3 Matrix: Water	EPA 625	<0.005	<0.005	N/A	N/A	
04-86	6	2-10	Miles Well	MES# 860340-4 Matrix: Water	EPA 625	<0.005	<0.005	N/A	N/A	
04-86	1	2-10	Cricket Spring	MES# 860340-5 Matrix: Water	EPA 625	<0.005	<0.005	N/A	N/A	
03-04-86	7	2-10	Birmingham-Old Well	MES# 860340-6 Matrix: Water	EPA 625	<0.005	<0.005	N/A	N/A	
03-19-86	4	2-10	Railroad Tunnel Spring, South Side	MES# 8603108.1 Matrix: Water	EPA 624 EPA 625	0.010	<0.005	Chloro- methane 0.006	<0.005	
03-19-86	8	2-10	New Birmingham Well	MES# 8603108.2 Matrix: Water	EPA 624 EPA 625	<0.005	<0.005	Total 0.10	<0.005	
03-31-86	2	2-10	Behren (Clatern) Well	MES# 860403-1 Matrix: Water	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
03-31-86	1	2-10	Cricket Spring	MES# 860403-5 Matrix: Water	EPA 624 EPA 625	1.4	Total 0.016	<0.005	<0.005	
03-31-86	5	2-10	Canning Factory Spring	MES# 860403-7 Matrix: Water	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
03-31-86	3	2-10	Behren Well, (In Use)	MES# 860403-2 Matrix: Water	EPA 624	N/A	N/A	<0.005	<0.005	
03-31-86	7	2-10	Birmingham-Old Well	MES# 860403-3 Matrix: Water	EPA 624	N/A	N/A	<0.005	<0.005	
03-31-86	6	2-10	Miles Well	MES# 860403-4 Matrix: Water	EPA 624	N/A	N/A	<0.005	<0.005	
03-31-86	10	2-10	Omaha City Well	MES# 860403-6 Matrix: Water	EPA 624	N/A	N/A	<0.005	<0.005	
06-24-86	9	2-10	Rincon Well	MES# 8606141-1 Matrix: Water	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
06-24-86	7	2-10	Birmingham-Old Well	MES# 8606141-2,12 Matrix: Water	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
06-24-86	8	2-10	Birmingham-New Well	MES# 8606141-3,13 Matrix: Water	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
06-24-86	6	2-10	Miles Well	MES# 8606141-4,14 Matrix: Water	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
06-24-86	10	2-10	Omaha City Well	MES# 8606141-5,15 Matrix: Water	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
06-24-86	2	2-10	Behren (Clatern) Well	MES# 8606141-6,16 Matrix: Water	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
06-24-86	3	2-10	Behren-New Well	MES# 8606141,7-17 Matrix: Water	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
06-24-86	1	2-10	Cricket Spring	MES# 8606141-8,18 Matrix: Water	EPA 624 EPA 625	<0.005	Phenol- thene 0.008	<0.005	<0.005	
06-24-86	4	2-10	Railroad Tunnel Spring, South Side	MES# 8606141-9,19 Matrix: Water	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	
06-24-86	5	2-10	Canning Factory Spring	MES# 8606141-9,19 Matrix: Water	EPA 624 EPA 625	<0.005	<0.005	<0.005	<0.005	

Sludge and soil samples collected during this sampling event showed varying concentrations of PCP and PNA compounds; PCP levels in the parts per million (ppm) range were detected in Cricket Spring channel. PNA concentrations at the parts per billion (ppb) level were detected in the Birmingham well.

A major sampling event occurred in June, 1985, directed towards characterizing the wastes sources at the site, and included sampling the sinkhole, the railroad ditch, the wood chip pile, and the area around the treatment cylinder. IT Corporation performed the sample collection and analyses for eight soil, sludge, and water samples. The results have been included as Table 2-4. A wide range of concentrations of PCP and VOA compounds were found in the obvious "hot spots" (waste source areas). PCP concentrations ranged from 50,000 ppm in the railroad ditch to less than detectable quantities in the majority of the wells and springs sampled. Dioxin and dibenzofuran determinations were performed on samples from the sinkhole, railroad ditch sludge pool, and the wood chip pile (see Table 2-5).

Geraghty & Miller, Inc. (G&M) also performed sampling during this month. Two sludge samples were taken (one from the railroad ditch and one from the sinkhole), in addition to two spring samples and two water well samples. The analyses were performed by International Solvent Recovery. No Quality Assurance/Quality Control information was available for these samples to determine if the procedures outlined in the QAPP have been followed, and these data have been presented in Appendix C, Preliminary Data.

G&M also performed a program of soil borings using a truckmounted auger. Five borings were completed in all, and the locations are shown in Figure 2-9. The objective of the boring program was to characterize the shallow subsurface environment in the immediate vicinity of the treating cylinder and several other locations within the site. The lithologic logs of the soil borings performed during this period are included in Table 2-6.

Boring B-1 was drilled into the concrete-covered sinkhole. This sinkhole had a four-foot thickness of a multi-phased liquid. The other soil borings did not indicate significant thicknesses of wastes, but aromatic hydrocarbon odors were noted from soil samples at various depths from all the borings.

McKesson Environmental Services also collected sludges, soils and water samples during this sampling event. The locations sampled included: Binam well, new Birmingham well, old Birmingham well, the spring at Cricket, south side of the

TABLE 2-4

Analytical Data from Samples Collected by IT Corporation
RI/FS Work Plan
Arkwood Inc. Site, Omaha, Arkansas

Results of Soil and Sludge Analysis for Volatile Priority Pollutants
 Sampling Performed: 06-04-85
 Concentrations in ug/gm (ppm)

Parameter	Sampling Point		
	Wood Chip Pile *	Railroad Ditch Disposal Area Center	Railroad Ditch Disposal Area East Edge
Acrolein	<0.10	<0.50	<0.50
Acrylonitrile	<0.10	<0.50	<0.50
Benzene	<0.010	0.11	<0.050
Bromoform	<0.010	<0.050	<0.050
Carbon Tetrachloride	<0.010	<0.050	<0.050
Chlorobenzene	<0.010	<0.050	<0.050
Chlorodibromomethane	<0.010	<0.050	<0.050
Chloroethane	<0.10	<0.50	<0.50
2-Chloroethylvinyl ether	<0.10	<0.50	<0.50
Chloroform	<0.010	<0.050	0.063
Dichlorobromomethane	<0.010	<0.050	<0.050
Dichlorodifluoromethane	<0.010	<0.050	<0.050
1,1-Dichloroethane	<0.010	<0.050	<0.050
1,2-Dichloroethane	<0.010	<0.050	<0.050
1,1-Dichloroethylene	<0.010	<0.050	<0.050
1,2-Dichloropropane	<0.010	<0.050	<0.050
1,3-Dichloropropylene	<0.010	<0.050	<0.050
Ethylbenzene	<0.010	3.2	0.080
Methyl bromide	<0.10	<0.50	<0.50
Methyl chloride	<0.10	<0.50	<0.50
Methylene chloride	<0.010	<0.050	<0.050
1,1,2,2-Tetrachloroethane	<0.010	<0.050	<0.050
Tetrachloroethylene	<0.010	<0.050	<0.050
Toluene	<0.010	1.8	0.59
trans-1,2-Dichloroethylene	<0.010	<0.050	<0.050
1,1,1-Trichloroethane	<0.010	<0.050	<0.050
1,1,2-Trichloroethane	<0.010	<0.050	<0.050
Trichloroethylene	<0.010	<0.050	<0.050
Trichlorofluoromethane	<0.010	<0.050	<0.050
Vinyl Chloride	<0.10	<0.50	<0.50

* Analysis for soil under wood chip pile, (depth of Sample Not Listed).

TABLE 2-4 (continued)

Analytical Data for Samples Collected by IT Corporation
RI/FS Work Plan
Arkwood Inc. Site, Omaha, Arkansas

Results of Water Analysis for Volatile Priority Pollutants
 Sampling Performed: 06-04-85
 Concentrations in ug/L (ppb)

Parameter	Sampling Point		
	Sinkhole Fluid	RR Tunnel Spring South Side	Cricket Spring
Acrolein	<1000	<10/10	<10
Acrylonitrile	<1000	<10/<10	<10
Benzene	1,300	<1.0/<1.0	<1.0
Bromoform	<100	<1.0/<1.0	<1.0
Carbon Tetrachloride	<100	<1.0/<1.0	<1.0
Chlorobenzene	<100	<1.0/<1.0	<1.0
Chlorodibromomethane	<100	<1.0/<1.0	<1.0
Chloroethane	<1000	<10/<10	<10
2-Chloroethylvinyl ether	<1000	<10/<10	<10
Chloroform	<100	<1.0/<1.0	<1.0
Dichlorobromomethane	<100	<1.0/<1.0	<1.0
Dichlorodifluoromethane	<100	<1.0/<1.0	<1.0
1,1-Dichloroethane	<100	<1.0/<1.0	<1.0
1,2-Dichloroethane	<100	<1.0/<1.0	<1.0
1,1-Dichloroethylene	<100	<1.0/<1.0	<1.0
1,2-Dichloropropane	<100	<1.0/<1.0	<1.0
1,3-Dichloropropylene (3)	<100	<1.0/<1.0	<1.0
Ethylbenzene	13,000	<1.0/<1.0	<1.0
Methyl bromide	<1000	<10/<10	<10
Methyl chloride	<1000	<10/<10	<10
Methylene chloride	<100	<1.0/<1.0	<1.0
1,1,2,2-Tetrachloroethane	<100	<1.0/<1.0	<1.0
Tetrachloroethylene	<100	<1.0/<1.0	<1.0
Toluene	12,000	<1.0/<1.0	4.1
trans-1,2-Dichloroethylene	<100	<1.0/<1.0	<1.0
1,1,1-Trichloroethane	<100	<1.0/<1.0	<1.0
1,1,2-Trichloroethane	360	<1.0/<1.0	<1.0
Trichloroethylene	<100	<1.0/<1.0	1.9
Trichlorofluoromethane	<100	<1.0/<1.0	<1.0
Vinyl Chloride	<1000	<10/<10	<10

TABLE 2-4 (continued)

Analytical Data from Samples Collected by IT Corporation
 RI/FS Work Plan
 Arkwood Inc. Site, Omaha, Arkansas

Results of Water Analysis For Volatile Priority Pollutants
 Sampling Performed: 06-04-85
 Concentrations in ug/L (ppb)

Parameter	Sampling Point	
	Birmingham New Well	Binam Well
Acrolein	<10	<10
Acrylonitrile	<10	<10
Benzene	<1.0	<1.0
Bromoform	<1.0	<1.0
Carbon Tetrachloride	<1.0	<1.0
Chlorobenzene	<1.0	<1.0
Chlorodibromomethane	<1.0	<1.0
Chloroethane	<10	<10
2-Chloroethylvinyl ether	<10	<10
Chloroform	<1.0	<1.0
Dichlorobromomethane	<1.0	<1.0
Dichlorodifluoromethane	<1.0	<1.0
1,1-Dichloroethane	<1.0	<1.0
1,2-Dichloroethane	<1.0	<1.0
1,1-Dichloroethylene	<1.0	<1.0
1,2-Dichloropropane	<1.0	<1.0
1,3-Dichloropropylene (3)	<1.0	<1.0
Ethylbenzene	<1.0	2.1 ✓
Methyl bromide	<10	<10
Methyl chloride	<10	<10
Methylene chloride	<10	<10
1,1,2,2-Tetrachloroethane	<1.0	<1.0
Tetrachloroethylene	<1.0	<1.0
Toluene	7.5	7.8 ✓
trans-1,2-Dichloroethylene	<1.0	<1.0
1,1,1-Trichloroethane	<1.0	<1.0
1,1,2-Trichloroethane	<1.0	<1.0
Trichloroethylene	<1.0	<1.0
Trichlorofluoromethane	<1.0	<1.0
Vinyl Chloride	<10	<10

TABLE 2-4 (continued)

Analytical Data for Samples Collected by IT Corporation
RI/FS Work Plan
Arkwood Inc. Site, Omaha, Arkansas

Results of Soil and Sludge Analysis for Base-Neutral
 Extractable Priority Pollutants
 Sampling Performed: U6-04-85
 Concentrations in ug/gm (ppm)

Parameter	Sampling Point			
	Wood Chip Pile *	RR Ditch Disposal Area Center	RR Ditch Disposal Area East Edge	Sinkhole Fuids
Acenaphthene	<0.10	<50	170/230	300
Acenaphthylene	<0.10	66	<50/<50	<50
Anthracene	<0.10	<50	<50/<50	<50
Benzidine	<0.40	<200	<200/<200	<200
Benzo(a)anthracene	<0.10	<50	<50/<50	<50
Benzo(a)pyrene	<0.10	<50	<50/<50	<50
3,4-Benzofluoranthene	<0.10	<50	<50/<50	<50
Benzo(g,h,i)perylene	<0.10	<50	<50/<50	<50
Benzo(k)fluoranthene	<0.10	<50	<50/<50	<50
Bis(2-chloroethoxy)methane	<0.10	<50	<50/<50	<50
Bis(2-chloroethyl)ether	<0.10	<50	<50/<50	<50
Bis(2-chloroisopropyl)ether	<0.10	<50	<50/<50	<50
Bis(chloromethyl)ether	<0.40	<200	<200/<200	<200
Bis(2-ethylhexyl)phthalate	1.3	<50	<50/<50	<50
4-Bromophenyl phenyl ether	<0.10	<50	<50/<50	<50
Butyl benzyl phthalate	<0.10	<50	<50/<50	<50
2-Chloronaphthalene	<0.10	<50	<50/<50	<50
4-Chlorophenyl phenyl ether	<0.10	<50	<50/<50	<50
Chrysene	<0.10	<50	<50/<50	<50
Dibenzo(ah)anthracene	<0.10	<50	<50/<50	<50
1,2-Dichlorobenzene	<0.10	<50	<50/<50	<50
1,3-Dichlorobenzene	<0.10	<50	<50/<50	<50
1,4-Dichlorobenzene	<0.10	<50	<50/<50	<50
3,3'-Dichlorobenzidine	<0.10	<50	<50/<50	<50
Diethyl phthalate	<0.10	<50	<50/<50	<50
Dimethyl phthalate	<0.10	<50	<50/<50	<50
Di-n-butyl phthalate	0.14	<50	<50/<50	<50
2,4-Dinitrotoluene	<0.10	<50	<50/<50	<50
2,6-Dinitrotoluene	<0.10	<50	<50/<50	<50
Di-n-octyl phthalate	<0.10	<50	<50/<50	<50
1,2-Diphenylhydrazine (Azobenzene)	<0.10	<50	<50/<50	<50
Fluoranthene	<0.10	<50	680/520	370
Fluorene	<0.10	<50	840/710	790
Hexachlorobenzene	<0.10	<50	<50/<50	<50

* Analysis for soil under wood chip pile, depth not listed.

TABLE 2-4 (Continued)

Analytical Data for Samples Collected by IT Corporation
RI/FS Work Plan
Arkwood Inc. Site, Omaha, Arkansas

Results of Soil and Sludge Analysis for Base-Neutral

Extractable Priority Pollutants

Sampling Performed: 06/04/85

Concentrations in ug/gm (ppm)

Parameter	Sampling Point			
	Wood Chip Pile *	RR Ditch	RR Ditch	Sinkhole Fluid
		Disposal Area Center	Disposal Area East Edge	
Hexachlorobutadiene	<0.10	<50	<50/<50	<50
Hexachlorocyclopentadiene	<0.10	<50	<50/<50	<50
Hexachloroethane	<0.10	<50	<50/<50	<50
Indeno(1,2,3-cd)pyrene	<0.10	<50	<50/<50	<50
Isophorone	<0.40	<200	<200/<200	<200
Napthalene	<0.10	930	<50/<50	1100
Nitrobenzene	<0.10	<50	<50/<50	<50
N-Nitrosodimethylamine	<0.10	<50	<50/<50	<50
N-Nitrosodi-n-propylamine	<0.10	<50	<50/<50	<50
N-Nitrosodiphenylamine (Diphenylamine) ⁽⁴⁾	<0.10	<50	<50/<50	1000
Phenanthrene	<0.10	<50	3600/3100	2000
Pyrene	<0.10	<50	<50/<50	<50
1,2,4-Trichlorobenzene	<0.10	<50	<50/<50	<50
2,3,7,8-Tetrachlorodibenzo- p-dioxin	<0.10	<50	<50/<50	<50

* Analysis for soil under wood chip pile, depth not listed.

TABLE 2-4 (Continued)

Analytical Data for Samples Collected by IT Corporation
RI/FS Work Plan
Arkwood Inc. Site, Omaha, Arkansas

Results of Water Analysis for Base-Neutral Extractable Priority Pollutants
 Sampling Performed: 06-04-85
 Concentrations in ug/L (ppb)

Parameter	Sampling Point			
	RR Tunnel Spring South Side	Cricket Spring	Birmingham New Well	Binam Well
Acenaphthene	<5.0	<5.0	<5.0	18/20
Acenaphthylene	<5.0	<5.0	<5.0	<5.0/<5.0
Anthracene	<5.0	<5.0	<5.0	<5.0/<5.0
Benzidine	<20	<20	<20	<20/<20
Benzo(a)anthracene	<5.0	<5.0	<5.0	<5.0/<5.0
Benzo(a)pyrene	<5.0	<5.0	<5.0	<5.0/<5.0
3,4-Benzofluoranthene	<5.0	<5.0	<5.0	<5.0/<5.0
Benzo(g,h,i)perylene	<5.0	<5.0	<5.0	<5.0/<5.0
Benzo(k)fluoranthene	<5.0	<5.0	<5.0	<5.0/<5.0
Bis(2-chloroethoxy)methane	<5.0	<5.0	<5.0	<5.0/<5.0
Bis(2-chloroethyl)ether	<5.0	<5.0	<5.0	<5.0/<5.0
Bis(2-chloroisopropyl)ether	<5.0	<5.0	<5.0	<5.0/<5.0
Bis(chloromethyl)ether ⁽³⁾	<5.0	<5.0	<5.0	<5.0/<5.0
Bis(2-ethylhexyl)phthalate	<20	<20	<20	<20/<20
4-Bromophenyl phenyl ether	<5.0	<5.0	<5.0	<5.0/<5.0
Butyl benzyl phthalate	<5.0	<5.0	<5.0	<5.0/<5.0
2-Chloronaphthalene	<5.0	<5.0	<5.0	<5.0/<5.0
4-Chlorophenyl phenyl ether	<5.0	<5.0	<5.0	<5.0/<5.0
Chrysene	<5.0	<5.0	<5.0	<5.0/<5.0
Dibenzo(ah)anthracene	<5.0	<5.0	<5.0	<5.0/<5.0
1,2-Dichlorobenzene	<5.0	<5.0	<5.0	<5.0/<5.0
1,3-Dichlorobenzene	<5.0	<5.0	<5.0	<5.0/<5.0
1,4-Dichlorobenzene	<5.0	<5.0	<5.0	<5.0/<5.0
3,3'-Dichlorobenzidine	<5.0	<5.0	<5.0	<5.0/<5.0
Diethyl phthalate	<5.0	<5.0	<5.0	<5.0/<5.0
Dimethyl phthalate	<5.0	<5.0	<5.0	<5.0/<5.0
Di-n-butyl phthalate	<5.0	<5.0	<5.0	<5.0/<5.0
2,4-Dinitrotoluene	<5.0	<5.0	<5.0	<5.0/<5.0
2,6-Dinitrotoluene	<5.0	<5.0	<5.0	<5.0/<5.0
Di-n-octyl phthalate	<5.0	<5.0	<5.0	<5.0/<5.0
1,2-Diphenylhydrazine (Azobenzene) ⁽⁴⁾	<5.0	<5.0	<5.0	<5.0/<5.0
Fluoranthene	<5.0	<5.0	<5.0	<5.0/<5.0
Fluorene	<5.0	<5.0	<5.0	6.3/7.1
Hexachlorobenzene	<5.0	<5.0	<5.0	<5.0/<5.0

TABLE 2-4 (continued)

Analytical Data for Samples Collected by IT Corporation
RI/FS Work Plan
Arkwood Inc. Site, Omaha, Arkansas

Results of Water Analysis for Base-Neutral Extractable Priority Pollutants
 Sampling Performed: 06-04-85
 Concentrations in ug/L (ppb)

Parameter	Sampling Point			
	RR Tunnel Spring South Side	Cricket Spring	Birmingham New Well	Binam Well
Hexachlorobutadiene	<5.0	<5.0	<5.0	<5.0/<5.0
Hexachlorocyclopentadiene	<5.0	<5.0	<5.0	<5.0/<5.0
Hexachloroethane	<5.0	<5.0	<5.0	<5.0/<5.0
Indeno(1,2,3-cd)pyrene	<5.0	<5.0	<5.0	<5.0/<5.0
Isophorone	<20	<20	<20	<20/<20
Napthalene	<5.0	<5.0	<5.0	14/14
Nitrobenzene	<5.0	<5.0	<5.0	<5.0/<5.0
N-Nitrosodimethylamine	<5.0	<5.0	<5.0	<5.0/<5.0
N-Nitrosodi-n-propylamine	<5.0	<5.0	<5.0	<5.0/<5.0
N-Nitrosodiphenylamine (Diphenylamine) ⁽⁴⁾	<5.0	<5.0	<5.0	<5.0/<5.0
Phenanthrene	<5.0	<5.0	<5.0	<5.0/<5.0
Pyrene	<5.0	<5.0	<5.0	<5.0/<5.0
1,2,4-Trichlorobenzene	<5.0	<5.0	<5.0	<5.0/<5.0
2,3,7,8-Tetrachlorodibenzo- p-dioxin	<5.0	<5.0	<5.0	<5.0/<5.0

RAT/13/crr

TABLE 2-4 (Continued.)

Analytical Data for Samples Collected by IT Corporation
RI/FS Work Plan
Arkwood Inc. Site, Omaha, Arkansas

Results of Soil and Sludge Analysis for Volatile Non-Priority Pollutants
 Sampling Performed: 06-04-85
 Concentrations in ug/gm (ppm)

Parameter	Sampling Point		
	Wood Chip Pile *	Railroad Ditch Disposal Area Center	Railroad Ditch Disposal Area East Edge
Acetone	<0.10	3.1	1.4
2-Butanone	<0.10	<0.50	<0.50
Carbon disulfide	<0.010	<0.050	<0.050
2-Hexanone	<0.10	<0.50	<0.50
4-Methyl-2-pentanone	<0.10	<0.50	<0.50
Styrene	<0.010	<0.050	0.053
Vinyl acetate	<0.10	<0.50	<0.50
Total xylenes	<0.010	3.1	2.9

* Analysis for soil under wood chip pile, depth not listed.

TABLE 2-4 (continued)

Analytical Data for Samples Collected by IT Corporation
RI/FS Work Plan
Arkwood Inc. Site, Omaha, Arkansas

Results of Water Analysis for Volatile Non-Priority Pollutants
 Sampling Performed: 06-04-85
 Concentrations in ug/L (ppb)

Parameter	Sampling Point				
	Sinkhole Fluid	RR Ditch Spring South Side	Cricket Spring	Birmingham New Well	Binam Well
Acetone	6400	<10/<10	24	<10	<10
2-Butanone	<1000	<10/<10	<10	<10	<10
Carbon disulfide	<100	<1.0/<1.0	<1.0	<1.0	<1.0
2-Hexanone	<1000	<10/<10	<10	<10	<10
4-Methyl-2-pentanone	<1000	<10/<10	<10	<10	<10
Styrene	1700	<1.0/<1.0	<1.0	<1.0	<1.0
Vinyl acetate	<1000	<10/<10	<10	<10	<10
Total xylenes	<100	<1.0/<1.0	<1.0	<1.0	4.0

TABLE 2-4 (Continued)

Analytical Data for Samples Collected by IT CorporationRI/FS Work PlanArkwood Inc. Site, Omaha, Arkansas

Results of Soil and Sludge Analysis for Acid Extractable Priority Pollutants

Sampling Performed: 06-04-85

Concentrations in ug/gm (ppm)

Parameter	Sampling Soil			
	Wood Chip Pile *	RR Ditch Disposal Area Center	RR Ditch Disposal Area East Edge	Sinkhole Fluid
2-Chlorophenol	<0.10	<50	<50/<50	<50
2,4-Dichlorophenol	<0.10	<50	<50/<50	<50
2,4-Dimethylphenol	<0.10	<50	<50/<50	<50
4,6-Dinitro-o-cresol	<1.0	<500	<500/<500	<500
2,4-Dinitrophenol	<1.0	<500	<500/<500	<500
2-Nitrophenol	<0.10	<50	<50/<50	<50
4-Nitrophenol	<0.10	<50	<50/<50	<50
p-Chloro-m-cresol	<0.10	<50	<50/<50	<50
Pentachlorophenol	0.64	31,000	50,000/47,000	16,000
Phenol	<0.10	<50	<50/<50	<50
2,4,6-Trichlorophenol	<0.10	<50	<50/<50	<50

* Analysis for soil under wood chip pile, depth not listed

TABLE 2-4 (Continued)

Analytical Data for Samples Collected by IT Corporation
RI/FS Work Plan
Arkwood Inc. Site, Omaha, Arkansas

Results of Water Analysis for Acid Extractable Priority Pollutants

Sampling Performed: 06-04-85

Concentrations in ug/L (ppb)

Parameter	Sampling Code			
	RR Tunnel Spring South Side	Cricket Spring	Birmingham New Well	Binam Well
2-Chlorophenol	<5.0	<5.0	<5.0	<5.0/<5.0
2,4-Dichlorophenol	<5.0	<5.0	<5.0	<5.0/<5.0
2,4-Dimethylphenol	<5.0	<5.0	<5.0	<5.0/<5.0
4,6-Dinitro-o-cresol	<20	<20	<20	<20/<20
2,4-Dinitrophenol	<20	<20	<20	<20/<20
2-Nitrophenol	<5.0	<5.0	<5.0	<5.0/<5.0
4-Nitrophenol	<5.0	<5.0	<5.0	<5.0/<5.0
p-Chloro-m-cresol	<5.0	<5.0	<5.0	<5.0/<5.0
Pentachlorophenol	<5.0	5100	<5.0	<5.0/<5.0
Phenol		<5.0	<5.0	<5.0
<5.0/<5.0				
2,4,6-Trichlorophenol	<5.0	<5.0	<5.0	<5.0/<5.0

TABLE 2-4 (Continued)

Analytical Data for Samples Collected by IT Corporation
RI/FS Work Plan
Arkwood Inc. Site, Omaha, Arkansas

Results of Soil and Sludge Analysis for Non-Priority Pollutant Compounds
 Sampling Performed: 06-04-85
 Concentration in ug/gm (ppm)

Parameter	Sampling Point			
	Wood Chip Pile *	RR Ditch Disposal Area Center	RR Ditch Disposal Area East Edge	Sinkhole Fluid
Aniline	<50	<50	<50/<50	<50
Benzoic Acid	<50	<50	<50/<50	<50
Benzly Alcohol	<50	<50	<50/<50	<50
4-Chloroaniline	<50	<50	<50/<50	<50
Dibenzofuran	<50	<50	730/670	800
2-Methylnaphthalene	<50	2000	<50/<50	3600
2-Methylphenol	<50	<50	<50/<50	<50
4-Methylphenol	<50	<50	<50/<50	<50
2-Nitroaniline	<50	150	<50/<50	210
3-Nitroaniline	<50	<50	<50/<50	<50
4-Nitroaniline	<50	<50	<50/<50	<50
2,4,5-Trichlorophenol	<50	<50	<50/<50	<50

* Analysis for soil under wood chip pile, depth not listed

TABLE 2-4 (Continued)

Analytical Data for Samples Collected by IT Corporation
RI/FS Work Plan
Arkwood Inc. Site, Omaha, Arkansas

Results of Water Analysis for Non-Priority Pollutant Compounds
 Sampling Performed: 06-04-85
 Concentrations in ug/L (ppb)

Parameter	Sampling Point			
	RR Tunnel Spring South Side	Cricket Spring	Birmingham New Well	Binam Well
Aniline	<5.0	<5.0	<5.0	<5.0/5.0
Benzoic Acid	<5.0	<5.0	<5.0	<5.0/5.0
Benzyl Alcohol	<5.0	<5.0	<5.0	<5.0/5.0
4-Chloroaniline	<5.0	<5.0	<5.0	<5.0/5.0
Dibenzofuran	<5.0	<5.0	<5.0	14/12
2-Methylnaphthalene	<5.0	<5.0	<5.0	81/82
2-Methylphenol	<5.0	<5.0	<5.0	<5.0/5.0
4-Methylphenol	<5.0	<5.0	<5.0	<5.0/5.0
2-Nitroaniline	<5.0	<5.0	<5.0	<5.0/5.0
3-Nitroaniline	<5.0	<5.0	<5.0	<5.0/5.0
4-Nitroaniline	<5.0	<5.0	<5.0	<5.0/5.0
2,4,5-Trichlorophenol	<5.0	<5.0	<5.0	<5.0/5.0

RArkT/9/ksh

TABLE 2-5

Analytical Data for Polychlorinated
Dioxin/Furan Analysis (ng/gm)
RI/FS Work Plan
Arkwood, Inc. Site, Omaha, Arkansas

Sampling Performed: 06-02-85

FURANS	SINK HOLE ⁽³⁾		WOODCHIP PILE ⁽¹⁾		RAIL ROAD DITCH ⁽¹⁾	
	CAL	ANALYTICAL ⁽²⁾ IT ⁽¹⁾	DUPLICATE		CENTER EDGE	
tetra (total)	1.05	ND(1.6)	ND(0.2)	ND (0.22)	ND(19.3)	ND(7.7)
2,3,7,8-TCDF	0.37					
penta	9.81	ND(1.4)	ND(0.17)	ND(0.22)	ND(19.1)	ND(4.2)
hexa	974	ND(6.0)	ND(0.092)	ND(0.37)	ND(5.5)	ND(6.0)
hepta	10050	152	ND(0.57)	ND(0.18)	ND(5.9)	70.1
octa	4340	379	ND(0.88)	ND(0.35)	263	512
<u>DIOXINS</u>						
tetra (total)	5.4	ND(0.94)	ND(0.05)	ND(0.06)	ND(0.76)	ND(0.61)
2,3,7,8-TCDD	ND					
penta	111	ND(0.88)	ND(0.43)	ND(0.66)	ND(4.0)	ND(2.0)
hexa	832	7.5	ND(1.0)	ND(1.0)	39	71
hepta	13200	1120	5.5	3.6	940	2040
octa	1820	18500	103	77	32210	40600

Notes to Table:

- (1) Collected and analyzed by IT Analytical Services, analyzed June, 1985.
- (2) Collected by MES and analyzed by California Analytical Laboratories, analyzed June 1985.
ND = Not Detected at level specified in parenthesis
- (3) Samples were grab samples collected from the top phase

ArkRT/11/aad

TABLE 2-6

Soil Borings Data - Initial Soil Borings
RI/FS Work Plan
Arkwood, Inc. Site, Omaha, Arkansas

Boring Number	Location Number	Figure Number	Sample Method	Depth Interval (ft)	Lithology
B-1	11	2-9	Mud rotary Wash sample	0.0 - 0.3	Concrete slab
				0.3 - 1.3	Void - lost circulation
				1.3 - 5.3	Oily sludge *
				5.3 - 8.5	T.D. Brown limestone
B-2	12	2-9	Mud rotary	0.0 - 9.0	Red clay and chert *
				9.0 - 10.0	Red clay *
				10.0 - 12.0	Red clay and chert *
				12.0 - 14.5	T.D. Limestone with chert fragments *
B-3	13	2-9	Solid stem auger to 7 ft depth.	0.0 - 18.0	Red clay and chert *
			Split spoon and core barrel to 37 ft depth.	18.0 - 20.0	Red clay *
				20.0 - 26.5	Red clay and chert *
				26.5 - 30.0	Void - lost circulation
				30.0 - 33.0	Brown limestone
				33.0 - 37.0	T.D. Limestone with chert fragments
B-4	14	2-9	Solid stem auger	0.0 - 10.0	Red clay and chert *
B-5	15	2-9	Solid Stem auger	0.0 - 10.0	Red clay and chert

1 Soil boring program was conducted June 3 and 4, 1985 by Geraghty & Miller, Inc.

* Aromatic hydrocarbon odors noticed from soil samples.

RArkT/5/crr

railroad tunnel spring, the sinkhole, near the concrete pad over the sinkhole, near the treating room, and the wood chip pile at the east end of the yard. The samples from the known waste source areas showed concentrations of PCP ranging from 16 ppm to over 7,000 ppm. The only spring sample showing a significant amount of PCP was Cricket Spring, with 4.3 ppm. The remainder of the spring and well water samples showed less than detectable quantities. This data has been summarized in Table 2-3.

On June 11, 1985, ADPC&E sent to attorneys for MMI and Mr. Ormond (the property owner) a proposed Administrative Order on Consent for an RI/FS at the Arkwood site. Before agreement was reached on performing the RI/FS under the ADPC&E Consent Order, the Arkwood site was proposed for addition to the Superfund National Priorities List, Update No. 4 in September, 1985. The Arkwood site was added to the National Priorities List in late 1985.

On May 15, 1986, MMI entered into an Administrative Order on Consent with Region VI of the Environmental Protection Agency (EPA). This RI/FS Work Plan has been prepared in accordance with that Consent Order.

2.2 Task 2 - Plans and Management

2.2.1 Approach to the RI/FS

The Arkwood site is owned by people not bound by the Consent Order signed between EPA and MMI. The owners have granted limited access periodically.

Most of the domestic wells within a mile of the plant have been tested; only three wells located in a very small area between the plant and Cricket spring (to the west) showed any detectable contamination. It is believed that water entering this shallow ground water system flows laterally off site and entered deeper water supply wells through uncased portions of the wells. The flow occurs in interconnected solution cavities in the limestone formation. Ground water emerges as springs along Cricket Creek (about 400 yards west of the plant site) and Walnut Creek (about 400 yards east of the plant site).

A comprehensive phased investigative approach has been developed. The investigative approach takes into account the sampling and testing to date, and includes 2 phases. Phase 1 includes intensive sampling and characterization of the site and the surface and ground-water quality in the area; Phase 2 includes optional interim soil isolation of obviously impacted soils, and additional ground- and surface-water monitoring.

P
mECOLOGY AND ENVIRONMENT, INC.
REGION VI
MEMORANDUM

TO: Keith Bradley, Region VI RPO

FROM: William A. Hieber, FIT Environmental Scientist *WAH*

THRU: K.H. Malone, Jr., RPM *KAM*

DATE: January 6, 1986

SUBJ: Reconnaissance Inspection of Arkwood, Inc., Omaha, AR (AR2828)
TDD# R6-8512-11

The FIT was tasked to conduct a reconnaissance inspection at Arkwood, Inc. in Omaha, Arkansas. The FIT was required to prepare an inventory and determine the volume of waste material on-site. This inspection was conducted to complement the HRS package that has been prepared and to answer questions as to the amount of waste material still on-site.

Arkwood, Inc. is an inactive wood treating facility approximately 20 acres in size. It is located 1/4 mile south of Omaha, Arkansas west of Route 65 (see attached map). The site had been leased and operated by Mass Merchandisers, Inc. of Harrison, Arkansas from 1970 until 1985 when their lease expired. The owner, Mr. H.C. Ormand, had operated the site from 1962 to 1970.

The reconnaissance inspection was conducted on December 19, 1985 by FIT member William A. Hieber who was accompanied by US EPA representative, Joe Roberto. During the inspection, very little evidence of any waste material was found on-site.

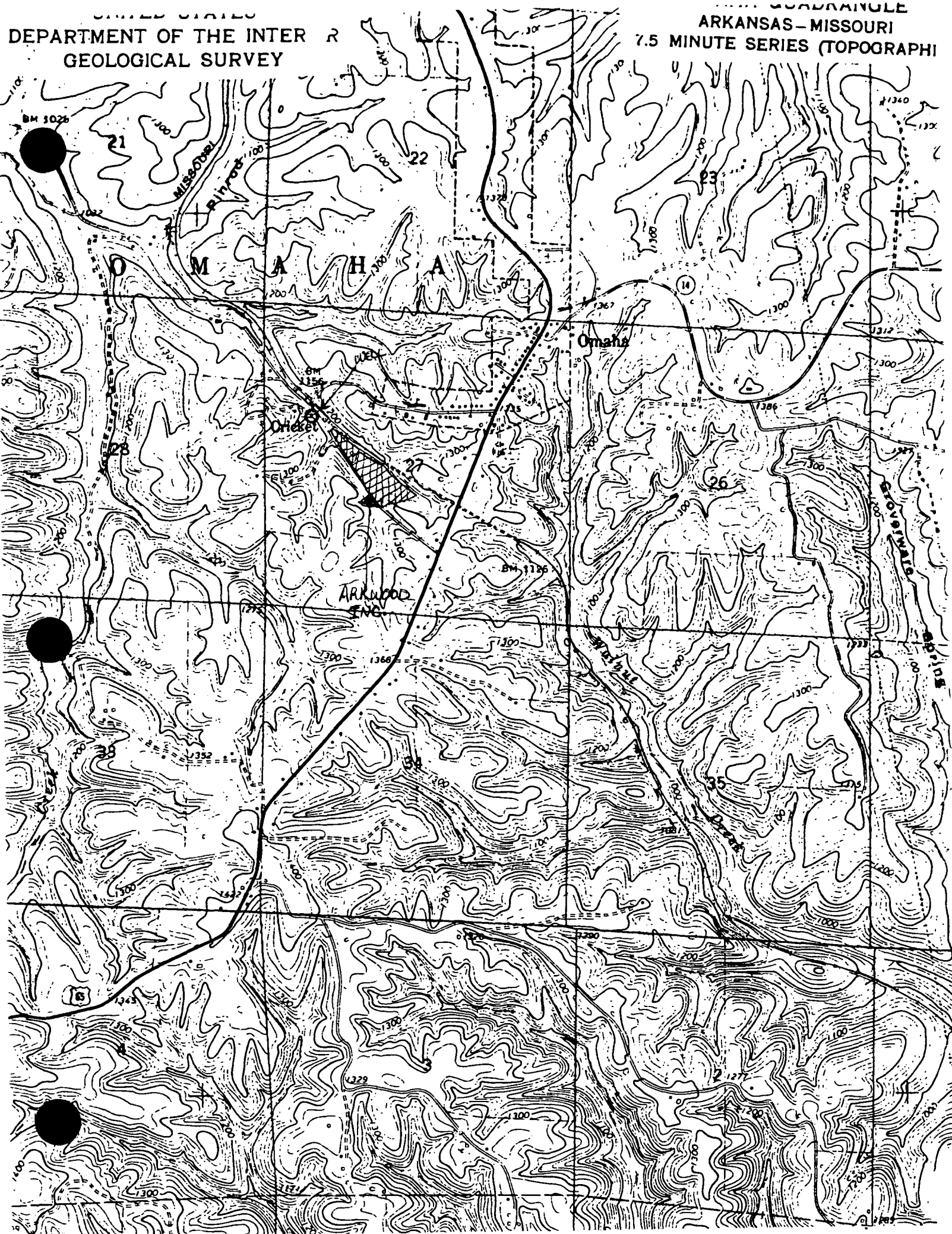
On December 20, 1985, FIT returned to the site and met with Mr. Bob Barker, Vice President of Support Systems for Mass Merchandisers, Inc., who showed the inspectors a wood chip pile and an adjacent pit. The wood chip pile, previously called a sawdust pile, consists of approximately two dump truck loads or 18 cubic yards of material. It is located at the east end of the property (see attached photos and site sketch). Mr. Barker explained that local turkey farmers would periodically come and pick up the wood chips for use on the floors of their turkey coops. He stated that no liquid wastes were ever put on the wood chips.

Reviewed by GAW-SC
date

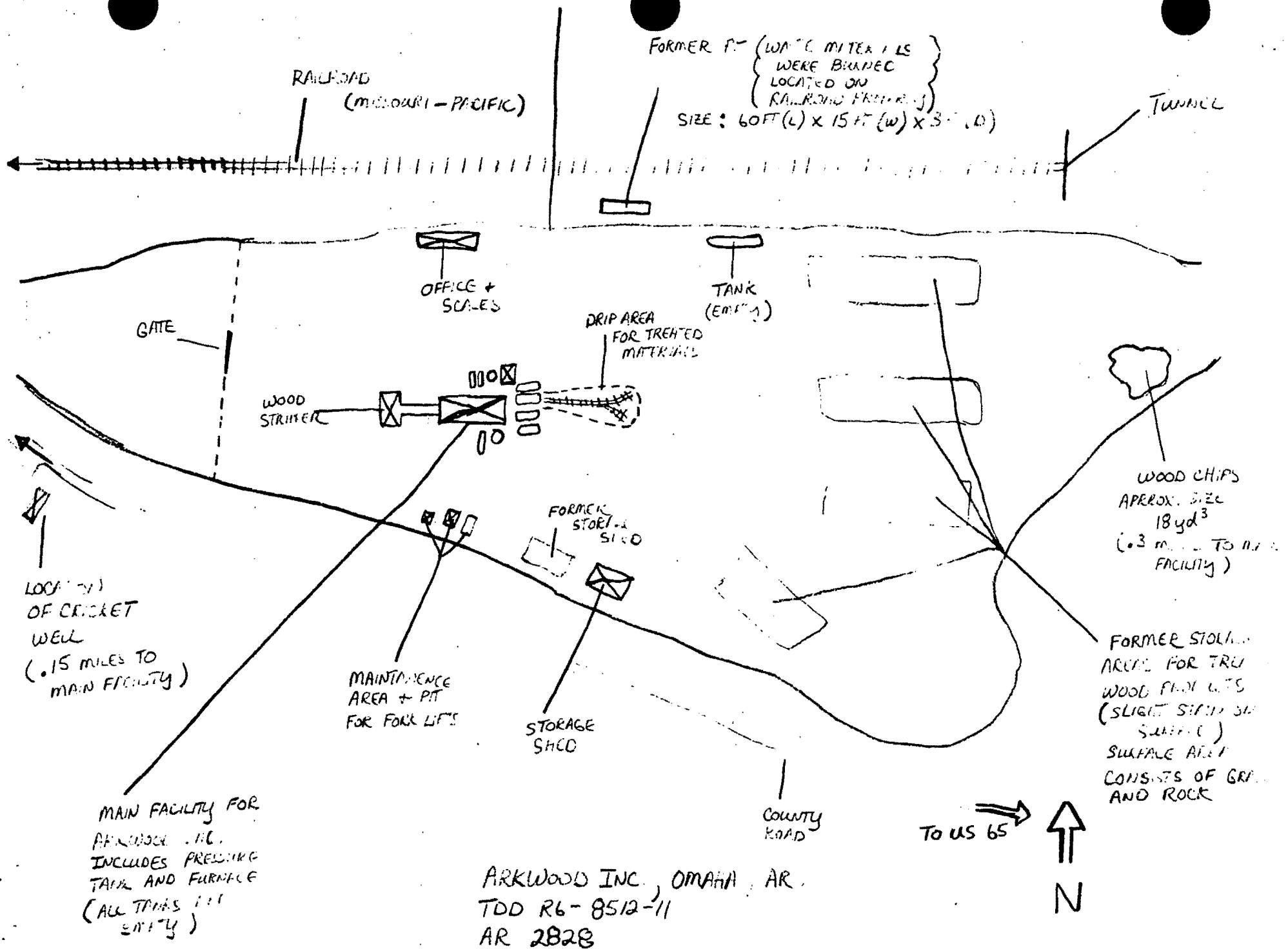
He added that an oily liquid (Mass Merchandisers, Inc. waste by-products) had been spread over the roadway areas at different times to keep the dust down when trucks and forklifts were storing or loading the treated wood materials.

The pit, located on the railroad property north of the site, is empty (see attached photos and site sketch). Mr. Barker explained that the pit had been used to burn waste materials, using old rubber tires to start and sustain the burning. That practice was stopped in the mid to late 1970's when the firm started to recycle most of their by-products. The pit is currently empty and is ill defined since it has not been used for some time. The approximate dimensions of the pit are; 60 ft. (length) x 15 ft. (width) x 3 ft. (depth).

In summary, the site appeared to be well maintained and there were no visible signs of mismanaged or improper dumping of waste materials.



EMBARKMENT (APRIL 2011 FILE)





1+2

Photographer / Witness

W. HIEBER / J. ROBERTO

Date / Time / Direction

12-19-85 / 1420 / WEST

Comments:

PANORAMIC OF ARKWOOD

INC. SITE. APPROX.

20 ACRES.



③

Photographer / Witness

W. HIEBER / J. ROBERTO

Date / Time / Direction

12-19-85 / 1445 / WEST

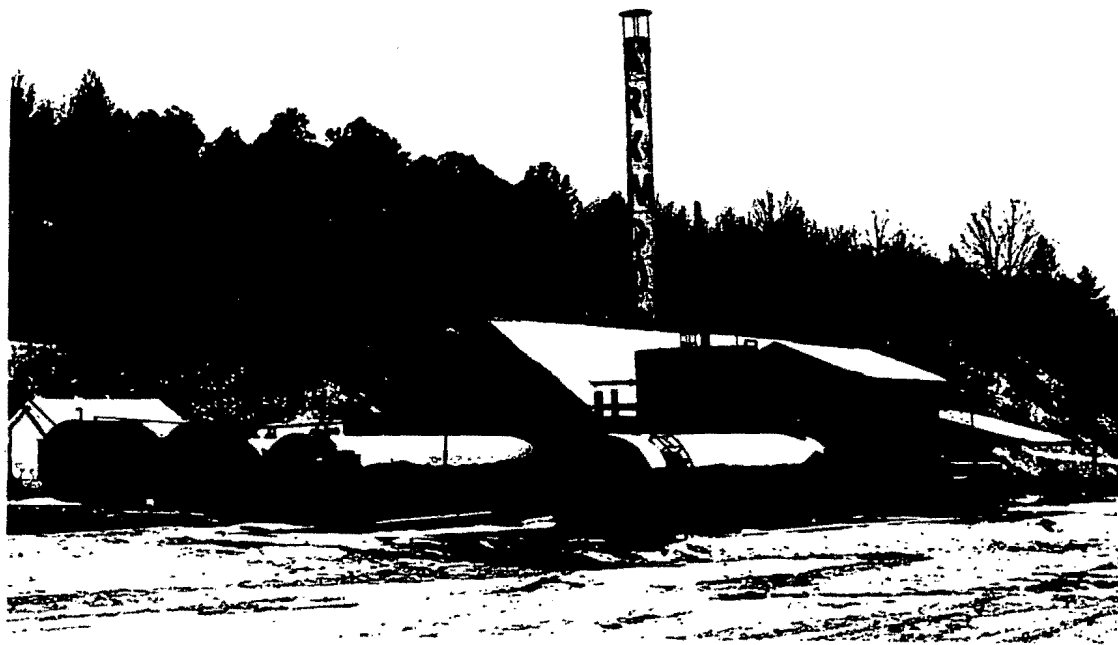
Comments:

ARKWOOD INC. FACILITY

(WOOD TREATING) AND

DRIP PAD MADE OF

CONCRETE. (FORE GROUND)



④

Photographer / Witness

WM HIEBER / J. ROBERTO

Date / Time / Direction

12-19-85 / 1450 / WEST

Comments:

ARKWOOD INC. WOOD

TREATING FACILITY WHICH

IS INACTIVE. TANKS ARE

EMPTY.



5 + 6

Photographer / Witness

W. HIEBER / J. ROBERTO

Date / Time / Direction

12-20-85 / 0930 / EAST

Comments:

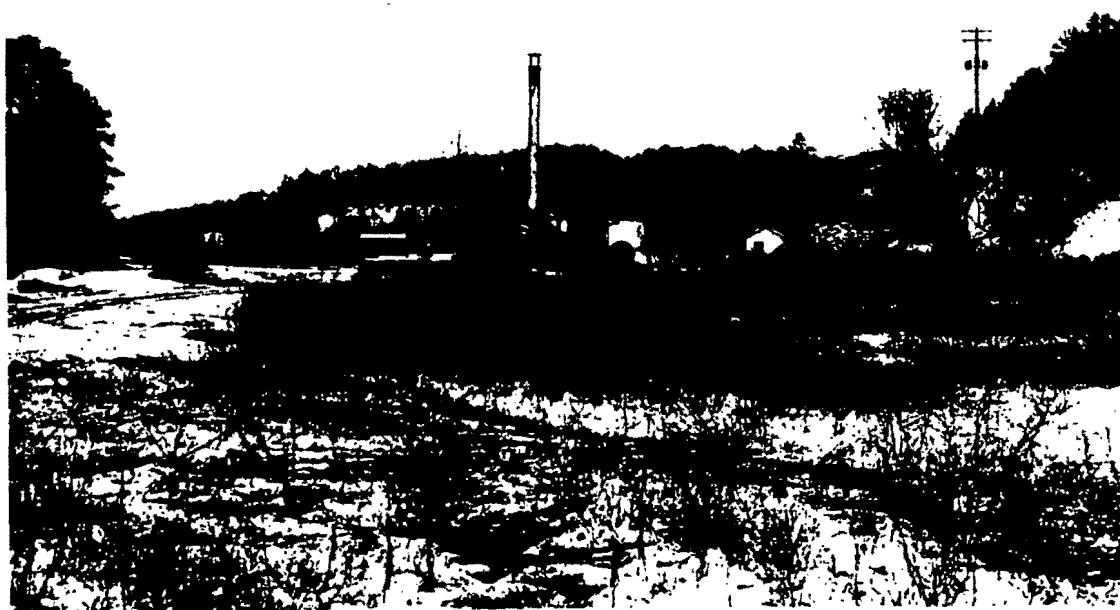
WOOD CHIP AND SAW DUST

PILE. APPROX. TWO

DUMP TRUCK LOADS OR

18 yds³ NO CHEMICALS

WERE PUT ON THE PILE.



⑦

Photographer / Witness

W. HIERCO / J. ROBERTO

Date / Time / Direction

12-20-85 / 0950 / EAST

Comments:

ENTRANCE TO ARKWOOD

INC. FACILITY WITH

PLANT IN THE BACKGROUND



⑧

Photographer / Witness

W. HIERER / J. ROBERTO

Date / Time / Direction

12-20-85 / 1010 / SOUTH

Comments:

NEAREST WELL TO
SITE REFERED TO
AS CRICKETT WELL.
(LOCATED IN HOUSE)



Photographer / Witness

Date / Time / Direction

Comments:

Photographer / Witness

W. HIEBER / J. ROBERTO

Date / Time / Direction

12-20-85 / 1015 / SOUTH

Comments: EMBANKMENT

LOOKING UP AT ARKWOOD
SITE FROM THE RAILROAD
AND PIT AREA

⑨

Photographer / Witness

Date / Time / Direction

Comments:



(10)



(11)

Photographer / Witness

W. HIEBER / J. ROBERTO

Date / Time / Direction

12-20-95 / 1020 / WEST

Comments:

EMPTY PIT THAT WAS

USED BY ARKWOOD INC.

TO BURN WASTE MATERIAL

AND RUBBER TIRES

(PIT - 60 FT (L) X 15 FT (W) X 3 FT (D))



Photographer / Witness

Date / Time / Direction

Comments:

Photographer / Witness

W. HIEBED / J. ROBERTO

Date / Time / Direction

12-20-85 / 1025 / EAST

Comments: EMPTY PIT

USED BY ARKWOOD INC.
WITH RAILROAD TUNNEL-
IN THE BACKGROUND.

Photographer / Witness

Date / Time / Direction

Comments:

Ref 12 (cont.)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VI

1201 ELM STREET

DALLAS, TEXAS 75270

January 15, 1986

MEMORANDUM

SUBJECT: Arkwood Site

FROM: Barry Nash, Region 6 NPL Coordinator *BN*
Superfund Site Assessment Section (6HES)

To: File

I spoke with Bill Hieber, Ecology and Environment, Inc. FIT team member, concerning his measurement of the railroad ditch lagoon. He paced off the distance from one end of the pit to the other. He believes his measurement was accurate to plus or minus five feet (i.e. final measurement may be 55-65 feet).

His statements regarding the definition of the lagoon refer to the fact that the site is not a classic, bermed lagoon. Instead, the natural site topography forms the containment basin.

cc: Martha Bodden, MITRE



McCLELLAND CONSULTING ENGINEERS INC.

Environmental and Materials Testing
Civil, Environmental and Chemical Engineering Consulting

LITTLE ROCK
JAMES E. McCLELLAND, P.E.
FRED NIELSEN, R.L.S.

PAYETTEVILLE
J.E. McCLELLAND, P.E.
VERNON D. ROWE, P.E.

May 26, 1982

81-16*

Arkwood
Ref 13

Mr. Doice Hughes
Arkansas Department of Pollution
Control and Ecology
8001 National Drive
Little Rock, Arkansas 72209

Re: Arkwood
Omaha, Arkansas

Dear Mr. Hughes:

This letter will provide you with an update on the situation at Arkwood relative to: (1) improved operational procedures now being practiced; (2) proposed physical improvements which will further minimize release of oil and pentachlorophenol into the environment; (3) the water and soil sampling results available to date; and (4) proposed continued water sampling.

OPERATIONAL PROCEDURES

Since you and Mr. Bates visited the Arkwood plant in January, several operational procedures have been adopted which have resulted in a drastic reduction in the quantity of oil released during the wood preserving process and subsequent product storage. These measures include the following:

1. The drain line from the sump under the treating cylinder door has been opened up. Each time the cylinder door is opened, released oil is caught in a container and manually transferred to the oil work tank, then reused. Any of the oil which is not captured in this manner enters the sump and flows back into the treating room floor pit where it is contained prior to being pumped to the sludge tank.

2. The initial air pressure and the vacuum time have been increased during the treating process. This results in essentially all of the excess oil in the treated products being removed prior to their withdrawal from the cylinder, thereby eliminating practically all of the "bleeding" which previously occurred.
3. The plant operating personnel have received instructions on general housekeeping measures aimed at preventing spills of any kind. The results of these efforts can be seen in the improved appearance both in and around the treating building.

In addition to the above, the source of the contamination of the steam condensate was found and eliminated from the discharge north of the office building. It was determined that the steam operated jet vacuum pump was picking up pentachlorophenol from the treating cylinder. This contaminated condensate is now being returned to the water tank instead of being discharged. This is recognized as a temporary measure until a comprehensive wastewater management program is implemented. Presently the only discharge north of the office building is the boiler blowdown.

PROPOSED IMPROVEMENTS

The following items are proposed for immediate implementation at Arkwood.

1. Seal the opening in the rock formation adjacent to the treating building. This would be done with a reinforced concrete slab and would prevent any future accidental spills or surface runoff from entering the opening.
2. Construct a concrete drip pad in front of the treating cylinder. This would drain back to the sump under the treating cylinder door.
3. Grade the area around the drip pad to preclude future stormwater drainage across that area.

These three items are seen as necessary first steps in any overall wastewater management system to be planned at Arkwood. It is believed that these improvements along with the present production curtailment due to the

economy (production is less than 50% of that one year ago) will greatly reduce the possibility of groundwater and surface water contamination in the near future.

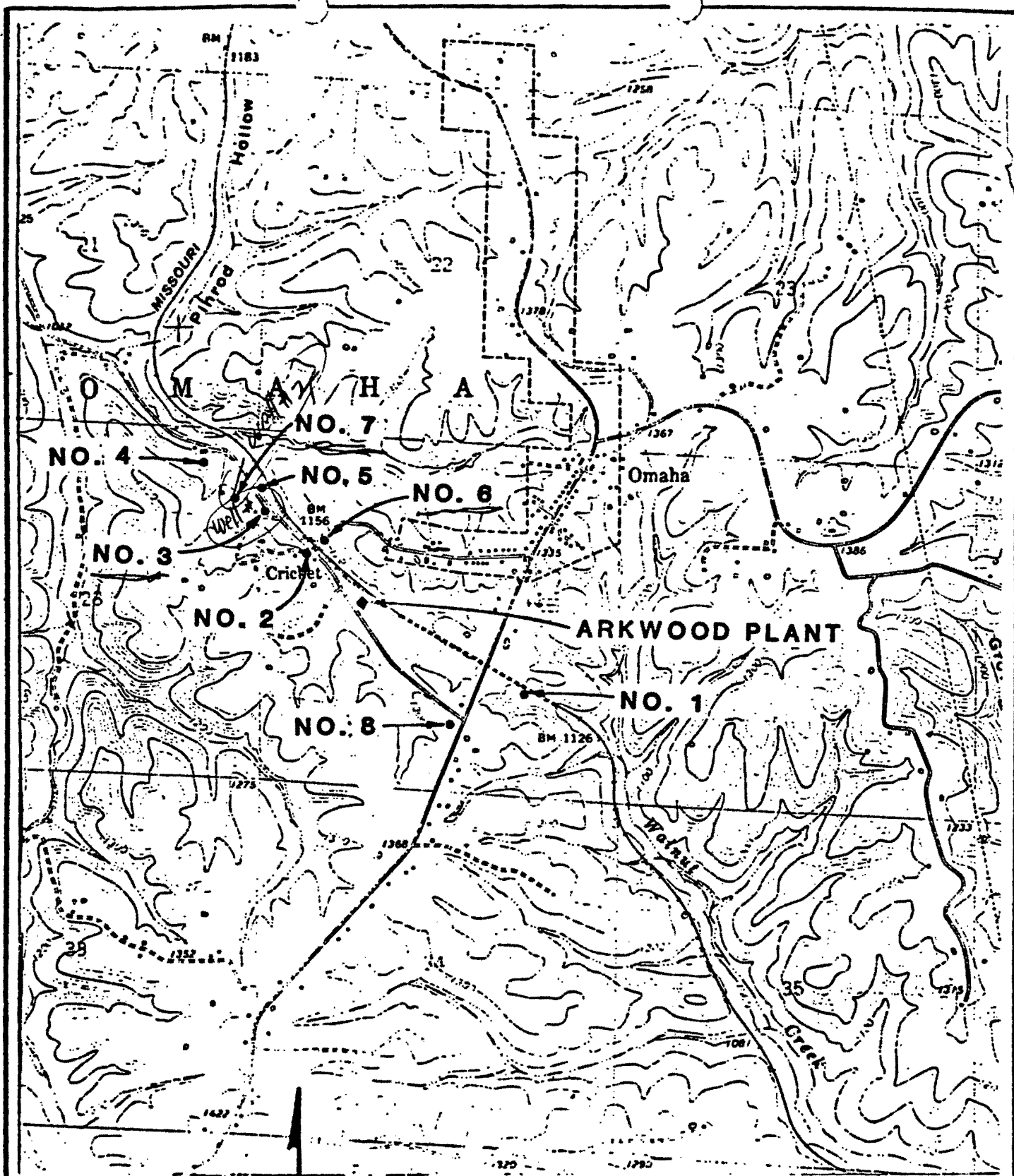
SAMPLING RESULTS

Soil. The objective of studying the soil conditions at the plant site was to determine the likelihood of groundwater contamination resulting from the practice of storing treated products on the open plant yard. The entire plant yard area is constructed of cherty clay fill material obtained on-site and compacted by years of heavy equipment traffic. A sample of the material was collected and found to have a permeability coefficient of 4.5×10^{-6} cm/sec. The results of the analysis are attached. Three individual sites on the treated products storage yard were randomly selected for investigation. At each of these locations, it could be seen that the soil surface was obviously contaminated with oil.

However, from two to six inches below the surface, no evidence of oil contamination could be seen at any of the sites. The storage yard has adequate surface drainage and, being constructed of material with low permeability, very little percolation to groundwater is thought to occur. While it is recognized that the contaminated soil in the treated products storage yard has resulted in some contaminated runoff water, it is very unlikely that this situation has contributed to any groundwater contamination.

Water. The objective of the water sampling done to date was to verify pentachlorophenol contamination of spring water entering the railroad tunnel adjacent to the plant site and to sample known wells and springs in the immediate vicinity of the plant.

Attached are two sheets showing water sample locations and results of pentachlorophenol analyses. As can be seen, three samples, No. 1, No. 2, and No. 3, were found to be contaminated. These three samples were from sources south of the railroad track and within $\frac{1}{2}$ mile of Arkwood's treating plant. Sample No. 3 is from the only known contaminated source with any apparent likelihood of being used as a drinking water supply. The owner of that property stated at the time of sampling that the well was not used for drinking purposes since contamination had been suspected. Instead, a second well on the property (which is not contaminated, Sample No. 7) was being utilized for that purpose.



NORTH
1" = 2000'±



McCLELLAND CONSULTING ENGINEERS, INC.

little rock

fayetteville

WATER SAMPLE LOCATIONS

4-15-82

ARKWOOD

OMAHA, ARKANSAS

81-161

Mr. Doice Hughes
Arkansas Department of Pollution
Control and Ecology

May 26, 1982
Page.....4

PROPOSED WATER SAMPLING

In view of the contaminated groundwater that is now known to exist in the vicinity of the wood preserving plant, it is proposed that water sampling be continued. This will make it possible to monitor the contamination over a period of time, and hopefully within approximately six months will provide enough data to determine whether or not an extensive geohydrologic survey should be conducted.

Specifically, it is proposed that the following sources be sampled on a monthly basis and analyzed for pentachlorophenol:

<u>Source</u>	<u>Sample No.-4/15/82 Survey</u>
Railroad tunnel spring	1
Spring northwest of Arkwood	2
Binam well	6
Behren well No. 1, house	3
Behren well No. 2, field	7

SUMMARY

In summary, Arkwood's immediate goal is to minimize any future contamination of groundwater or surface water by: (1) process modifications; (2) improved housekeeping; and (3) site drainage improvements. Additionally, regular monitoring of the water sources listed above will provide data useful in determining a future course of action relative to the contaminated groundwater.-

If you have any questions after reviewing the above, please let us know.

Very truly yours,



Charles McLaughlin, P.E.

CMc:lrh

Enclosure

cc: Mr. Bob Barker
Mr. Devoe Gregory
Mr. Mike Bates

RESULTS OF PENTACHLOROPHENOL ANALYSES

Arkwood
Omaha, Arkansas

(Sampled April 14, 1982)

<u>Sample No.</u>	<u>Location</u>	<u>Pentachlorophenol, mg/l</u>
1	Railroad tunnel spring, south side, near east end	5.6
2	Spring west of plant, south of county road	8.3
3	Well behind Behren residence (No. 1 - 150' deep)	5.6
4	Spring behind old cannery	< 0.005
5	Spring under railroad tracks, west of plant, north of county road	< 0.005
6	Well behind Binam residence	< 0.005
7	Well in Behren field (No. 2 - 400' deep)	< 0.005
8	City water from Scroggins residence at Highway 65 and Arkwood Road	< 0.005



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Environmental and Materials Testing
Civil, Environmental and Chemical Engineering Consulting

LITTLE ROCK
JAMES E. McCLELLAND, P.E.
FRED NIELSEN, R.L.S.

FAYETTEVILLE
J.E. McCLELLAND, P.E.
VERNON D. ROWE, P.E.

August 31, 1982

81-161

Arkwood
Ref 13 (cont).

Mr. Doice Hughes
Arkansas Department of Pollution
Control and Ecology
8001 National Drive
Little Rock, Arkansas 72209

Re: Arkwood
Omaha, Arkansas

Dear Mr. Hughes:

In response to your request for certain information regarding the Arkwood plant and related environmental concerns, the following report is submitted for your consideration.

HISTORIES OF BEHREN'S WELLS

Discussions with Mr. Bill Arnold, well driller, and Mr. Bob Barker of Arkwood, revealed the following concerning Mr. Behren's wells:

Well No. 1. This well, which is located approximately 20 feet south of the Behren residence, is 150 feet deep and was drilled in 1965 or 1966. This was prior to the time well drilling records were required to be kept, but the practice at the time was to case a well one or two feet into solid rock. In this case, the well was probably cased about 20 feet deep and not grouted. Pumping tests indicated a yield of approximately 1/2 gallon per minute. Since a new well (Well No. 3) has been placed into service, Well No. 1 is now abandoned.

Continued -

Mr. Doice Hughes
Arkansas Department of Pollution
Control and Ecology

August 31, 1982
Page.....2

Well No. 2. Drilled in about 1978, this well is located in a field approximately 500 feet northwest of the Behren residence. This well is approximately 420 feet deep and was probably cased to a depth of approximately 80 feet. The yield was approximately 5 gallons per minute. Although we do not have a copy of the drilling log, it should be available if needed.

Well No. 3. Last month Arkwood drilled a new well for Mr. Behren approximately 100 feet south of his house. This well was drilled 580 feet deep and is now connected to the house plumbing, thus replacing Well No. 1. A copy of the drilling log for Well No. 3 will be forwarded to you when available.

RESULTS OF WATER SAMPLE ANALYSES

Wells and Springs. A summary of pentachlorophenol analyses performed on recent well and spring samples is attached. Groundwater contamination by PCP has apparently decreased significantly over the past few months.

Plant Yard Stormwater Runoff. Arkwood recently collected a sample of rain runoff from the plant yard on August 13, 1982. This sample contained 0.037 mg/l PCP.

Walnut Creek. A sample from Walnut Creek, approximately 5 miles east of Arkwood was collected on August 23rd. This sample contained 0.0002 mg/l PCP apparently indicating there is very little stream contamination resulting from Arkwood's operation.

Sludge Impoundment on Railroad R/W. On July 26, 1982, a sample of the liquid in this impoundment was collected and analyzed and found to contain 0.24 mg/l PCP. This sample was taken from the surface which was covered with an oily film. The depth of the liquid was approximately one foot. Wastewater flow to this impoundment has ceased, and surface drainage from the plant yard has been diverted so that it no longer passes into this area.

GEOLOGY REPORT

We have attached a copy of a letter and a report from Mr. Thomas Millard concerning the geology in the vicinity of the Arkwood plant. Mr. Millard believes, as we all had previously suspected, that PCP contamination of

Continued -

Mr. Doice Hughes
Arkansas Department of Pollution
Control and Ecology

August 31, 1982
Page.....3

the groundwater originated from the two sludge disposal sites on the property rather than by percolation from the surface of the yard in general. Copies of the results of percolation tests conducted by Mr. Millard will be forwarded to you at a later date.

PHYSICAL IMPROVEMENTS

Arkwood plans to begin immediately the construction of the three items proposed in my May 26, 1982, correspondence to you. In addition, the old sludge disposal sump at the east edge of the yard has been capped with a one to two foot layer of cherty clay material in an effort to prevent surface runoff from being retained in the sump and allowed to travel to the groundwater through rock fissures. Rerouting of the surface drainage in this area is also planned so as to eliminate runoff from off-site flowing across the old dump site and the plant yard in general. It is Arkwood's intention to immediately begin implementing all of the improvements discussed herein and to have them completed by the end of the year.

*where is
this sump*

PROPOSED NEW PROCESS

Arkwood is presently considering adding a waterborne treating system to their plant. Such a system, along with a proposed oil/water separator would permit wastewater resulting from the oil based process to be utilized in the waterborne system, thereby reducing the overall plant process wastewater to essentially zero.

We hope you will find the above information satisfactory. If you need anything further at this time, please contact us.

Sincerely,

Charles McLaughlin, P.E.

CMcL/paa

Enclosure: Summary of PCP Analyses
Geology Report

cc: Mr. Bob Barker
Mr. Devoe Gregory
Mr. Mike Bates

Arkwood REF 13



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Environmental and Materials Testing
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FAYETTEVILLE
J.E. McCLELLAND, P.E.
VERNON D. ROWE, P.E.

October 17, 1983

81-161

Mr. Doice Hughes
Arkansas Department of Pollution
Control and Ecology
8001 National Drive
Little Rock, Arkansas 72209

RE: Arkwood
Omaha, Arkansas

Dear Mr. Hughes:

Three water samples were collected near the Arkwood plant on September 30, 1983. The results of pentachlorophenol analyses on these samples are as follows:

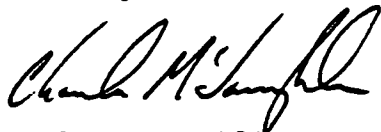
<u>Sample Description</u>	<u>PCP, mg/l</u>
Spring west of plant, south of county road	97
Behren Well No. 2	0.0026
Behren Well No. 3	0.0002

No sample was collected from the railroad tunnel spring on this trip due to unusually high train traffic at the time of sampling.

I have discussed the results of the spring sample with Mr. Barker of Arkwood who explained that they recently discovered that a crack in the floor of the treating room pit was apparently allowing some of the pit contents to leak from the pit. Since this became known, operational procedures have been changed so that the pit is now kept pumped out as much as possible to minimize any leaking. In addition, Mr. Barker plans to, within the next two to three weeks, clean out the pit and seal the leak.

We trust that this will meet with your approval. Please advise if you have any questions.

Sincerely,

A handwritten signature in cursive script, appearing to read "Charles McLaughlin".

Charles McLaughlin

CMcL/kms

cc: Mr. Bob Barker
Mr. Devoe Gregory



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Environmental and Materials Testing
Civil, Environmental and Chemical Engineering Consulting

LITTLE ROCK
JAMES E. McCLELLAND, P.E.
FRED NIELSEN, R.L.S.

FAYETTEVILLE
J.E. McCLELLAND, P.E.
VERNON D. ROWE, P.E.

September 29, 1982

81-161

Mr. Doice Hughes
Arkansas Department of Pollution
Control and Ecology
8001 National Drive
Little Rock, Arkansas 72209

Re: Arkwood
Omaha, Arkansas

Dear Mr. Hughes:

In my correspondence to you dated August 31, 1982, I stated that a water well report and percolation test results would be forthcoming. Please find these documents enclosed.

Sincerely,

Charles McLaughlin, P.E.

CMcL/paa

Enclosure: Water Well Report
Percolation Test Results

cc: Mr. Bob Barker
Mr. Devoe Gregory

SEP 2 1982

STATE OF ARKANSAS

REPORT OF WATER WELL CONSTRUCTION

New Well ☒ Work-over Well ☐ Replacement Well ☐
 Owner of Well Robert B. Behrens Bab Barker ARK. Woods County Boone
 Contractor Harold L. Kink C 1151 (in which well is located)
 Driller Name and No. Harold L. Kink D2312 Well is near County Road
 Date Well was Completed 7-17-82 Section 27 Township 21N Range 24W
 Directions for Reaching Well: 1/2 m. S. Omaha
 (use permanent landmark)

1. Total Depth of Well 565 Ft.

2. Water Producing Formation: From 274 Ft.
More water in flinty 274 1/2 Ft.
lime - 380 to 387

3. Water Level Below Land Surface 240

4. Gallons per Hour 700

5. Well Disinfected with 65% bleach gravel

6. Casing to 5 1/2 Ft.

7. Cased with 1 1/4" ID Diameter Steel Casing

Cemented from 0 Ft. to 121 Ft.

9. Use of Well: Domestic ☒ Irrigation ☐ Municipal ☐ Other ☐

Description and Color of Formation (sand, shale, sandstone, etc.)	Depths from	in feet to
Top soil + chunk chert	0	20
ADDTY	20	32
Bone line	32	36
Brick Broken line	36	38
Fence line	38	40
Gravel line + mud	40	46
Grey line	46	380
" FINTY line	380	387
Dolomite line	387	565

Remarks:
 Signed: Harold L. Kink Date: 7-20-82

Form No. AWD-3

Mail to: Committee on Water Well Construction, 2915 So. Pine Street,
 Little Rock, Arkansas 72204

CUSTOMER COPY

C. J. McG
 cy - files

SEP 29 1982

THOMAS T. MILLARD

CONSULTANT SERVICES
NATURAL RESOURCE INVENTORIES
HARRISON, ARKANSAS

72601
Phone 865-3226

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- Real Estate
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- Unimproved Lands
- Recreation Areas

Se PT. 24 1982

Mc Cllland Consulting Engineers
1810 North College Fayetteville Ark.

Re: ARKWOOD DRAINAGE Problem
Soil Percolation Data.

Attention: Mr. Charles McLaughlin P.E.

Enclosed are field notes of ^{THE} on site study that should have been included in my report on the geology of the ARKWOOD area.

You will note I enlarged your water sample map, in order to show the Percolation test sites better. The test holes are indicated with a red x and numbered one through six.

I hope this information will meet your needs.

Very truly yours.

Thomas T. Millard

Orig - file
cy - Cymcl

THOMAS T. MILLARD

CONSULTANT SERVICES
NATURAL RESOURCE INVENTORIES
HARRISON, ARKANSAS

72601
Phone 365-3226

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On Site Data - Percolation Tests - ARKWOOD Stack yard OMAHA ARK.

Base map Water Sample Locations - Dated 4-15-82

Site #1 Very Cherty throughout, Small angular fragments.

Perc Rate - 2 Minutes = 1 inch (Profile too open to reach Soil Saturation Point)

Site #2 Profile and Soil material Similar to Site #1 with thin layer 2" thick on surface containing same red clay material mixed with Pent. residue.

Site #3 Perc Rate at 24" deep - 2 Min = 1 inch

Hard Packed Layer on surface, this layer Practically impervious but only 3" thick.

Soil Profile below hard Packed Layer is similar to Site #1 in soil material, approx. 70% fine angular chert, by volume. Perc Rate at 24" deep 2 min = 1 inch

Sites #1 #2 and #3

On Site tests Show the North Side of the stack yard Can carry much more Surface drainage than at Present, Since it has a very rapid Perc. Rate.

THOMAS T. MILLARD

CONSULTANT SERVICES - NATURAL RESOURCES
SOIL PERCOLATION & WATER TESTING
221 WEST RIDGE, HARRISON, ARK. 72601

THOMAS T. MILLARD

CONSULTANT SERVICES
NATURAL RESOURCE INVENTORIES
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Phone 365-3226

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- Mineral Surveys

- Real Estate
- Farm & Ranch Land
- Unimproved Lands
- Recreation Areas

On site Data - Percolation tests - Arkwood - Omaha Ark.

ALL Test HOLES - 24 in. Depth (tests taken after Saturation)

Site #4 (South side of Stack yard)

Clay filled Sissures occur in this area - The clay is a heavy Silty clay that has dissolved from the high grade Limestone. Perc rate 8 hrs = Less than 1 INCH.

Site #5 - Soil Profile Similar to Site #4 - Clay is brown and gray mottled, Silty clay to clay, (Compact when dry) Perc Rate 8 hrs = Less than 1 inch.

Site #6 This test hole is in direct alignment with the Sissure on the South east end of the stack yard.

Site #6 Soil Profile Similar to Sites #4 and #5, except Clay was more Moist and Sticky.

Perc. Rate - 8 hrs = Less than 1 inch.

The above 3 Sites would be rated as Very Slowly Permeable.

Field DATA COMPLETED = July 26 1982

THOMAS T. MILLARD

CONSULTANT SERVICES - NATURAL RESOURCES
SOIL PERCOLATION & WATER TESTING
925 WEST RIDGE, HARRISON, ARK. 72601

Thomas T. Millard



THE UNIVERSITY OF ARKANSAS
J. William Fulbright College of Arts and Sciences

Arkwood
Reference 14

Department of Geology

November 10, 1987

Ms. Martha Bodden, MS WF44
Mitre Corp
7525 Colshire Drive
Maclean, VA 22102-3481

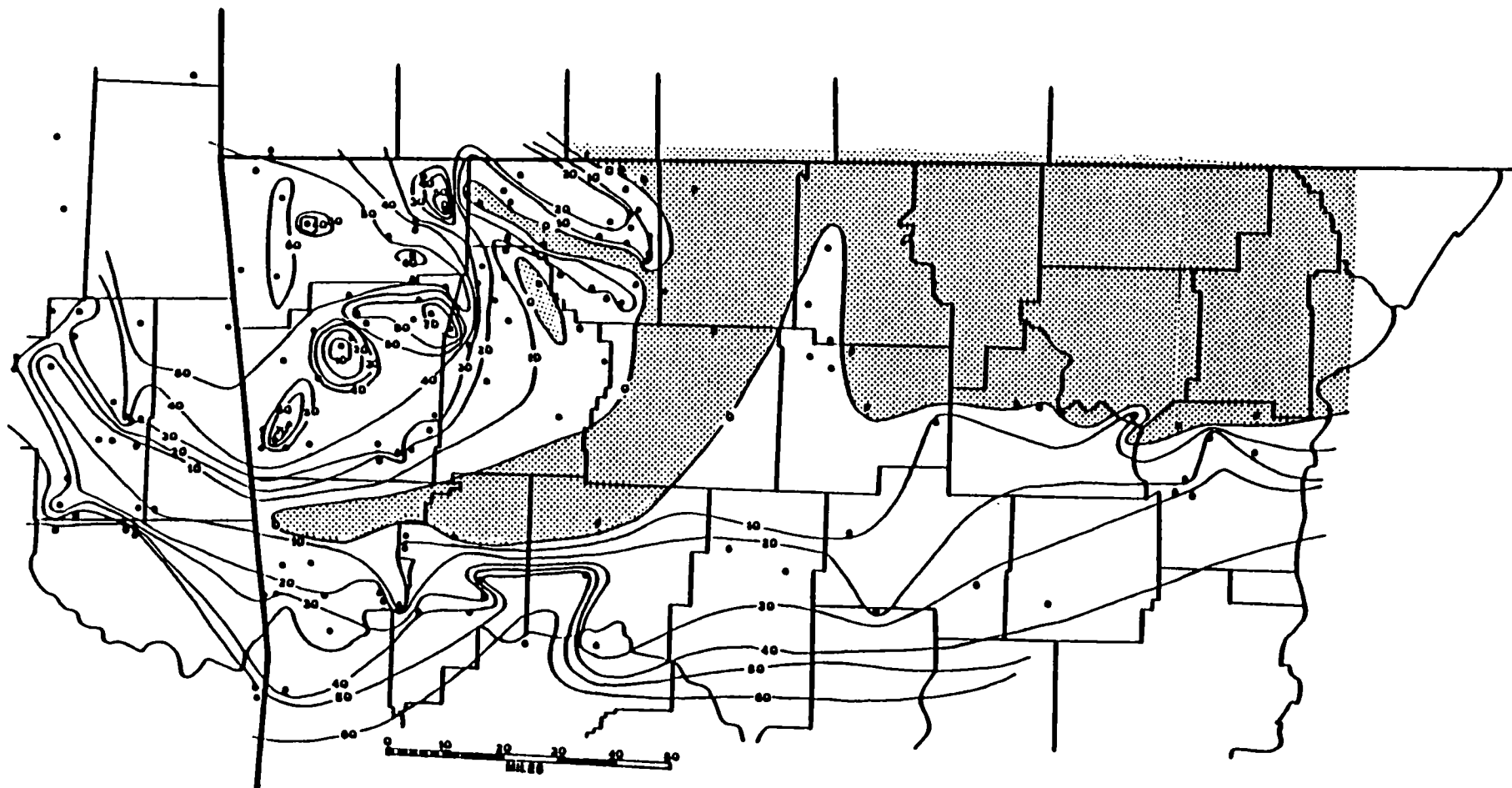
Dear Ms. Bodden:

Enclosed is a copy of an isopach map of the Chattanooga Formation in Northern Arkansas. The points are control wells and the stippled area indicates no Chattanooga. This map shows no Chattanooga in the Omaha area. Furthermore, I have seen no Chattanooga in the area myself. One of my stratigrapher friends assures me that the Mississippian sits directly on the Ordovician at Omaha, and points to a geologic section at Omaha as evidence. I hope this information will be useful.

Sincerely,

Kenneth F. Steele
Professor

KFS:lrs



ISOPACHOUS MAP - CHATTANOOGA SHALE
(from Terry, 1980)



United States Department of the Interior

GEOLOGICAL SURVEY
Water Resources Division
Arkansas District
2301 Federal Office Building
Little Rock, Arkansas 72201-3287

Arkwood
Reference 15

November 17, 1987

Ms. Martha Bodden
Mail Stop W744
Mitre Corporation
7525 Colshire Drive
McClain, VA 22102-3481

Dear Ms. Bodden:

Enclosed are some drillers logs within a 3 mile radius of the Arkwood site. A shale unit is mentioned on approximately half of the logs. It appears that the presence of the Chattanooga shale in the Omaha area is questionable and most likely discontinuous.

Depending on the driller, wells in the area are cased anywhere from 10 feet to 80 feet. These holes can therefore provide a possible interconnection between the Boone and Powell/Cotter aquifers since the casing most likely doesn't penetrate the entire thickness of the Boone.

I hope this information can be of help to you. If you have any further questions, please don't hesitate to call me at (501) 378-6391.

Sincerely,

Valarie A. Leidy
Valarie A. Leidy

Enclosure

STATE OF ARKANSAS
REPORT OF WATER WELL CONSTRUCTION

New Well ☒ Work-over Well ☐ Replacement Well ☐
Owner of Well **FERNAM JONES**
Well Contractor **BILL ARNOID**
Contractor License No. **C1077**
Driller Name and No. **JOHN ROBERTS D2209**
Date Well was Completed **3-15-79**

- 1 Total Depth of Well **550'** Ft.
 - 2 Water Producing Formation: From **520** Ft. To **530** Ft.
Water Level Below Land Surface **450'**
 - 4 Gallons per Hour **300**
 - 5 Well Disinfected with **C10ROX**
 - 6 Casing to **13** Ft.
 - 7 Cased with **6"** Diameter **PVC** Casing
 - 8 Cemented from **13** Ft. to **0** Ft.
X
 - 9 Use of Well: Domestic ☐ Irrigation ☐ Municipal ☐ Other ☐
- This well is guaranteed against defective material or workmanship for a period of **1 YEAR**

Form No. AWD-2

County **BOONE** (in which well is located)
Well is near **TOWER** Road
Section **32** Township **21 N** Range **21 W**
Directions for Reaching Well: **2 MILES WEST** (use permanent landmark)
ON TOWER ROAD

Description and Color of Formation (sand, shale, sandstone, etc.)	Depths from	in feet to
ROCK + CLAY	0	11
LIMESTONE	11	280
ST. JOE LIME	280	290
SAND	290	298
LIMESTONE	298	550

Remarks:
Signed: **Bill Arnold** Date: **3-24-79**

Mail to: Committee on Water Well Construction, 2915 So. Pine Street,
Little Rock, Arkansas 72204

Geology Copy

NEW WELL ☒REPLACEMENT WELL ☐STATE OF ARKANSAS
Report of Water Well Construction

County in which well is located:

BOONE

(Please print or type)

OWNER OF WELL

WELL CONTRACTOR

CONTRACTOR LICENSE NO.

NAME OF DRILLER

DRILLER REGISTRATION NO.

DATE WELL WAS COMPLETED

MO.

DAY

YR.

Well is near

1/4 1 mile East + 2 mile S of

Section 36, Township 21 N, Range 21 W

(TOWN, ETC.)

Directions for reaching well:

(use permanent landmarks)

1. Total Depth of Well

2. Water Producing Formation:

3. Method of Construction:

Rotary ☒ Cable ☐ Driven ☐ Jetted ☐ Bored ☐ Dug ☐

4. Water Level Below Land Surface

5. Gallons per Hour

Gallons per Minute

6. Well disinfected with

7. Cased to 62 ft. with 6" Diameter Casing

8. Cemented from 40 ft. to 62 ft.

9. Casing Perforated from ft. to ft.

10. Well Backfilled with

(SAND, CLAY, CEMENT, MUD)

11. Gravel Pack from ft. to ft.

12. Screen Diameter:

inches from ft. to ft.

13. Type Screen Fittings Slot Size

14. Use of Well:

DOMESTIC

IRRIGATION

MUNICIPAL

OTHER

Description and Color of Formation:

(Sand, Shale, Sandstone, etc.)

Depths in Feet

From To

Red clay and chunk rock	0	58
grey limestone	58	95
brown limestone	95	98
grey limestone	98	610

Remarks:

Signed:

Date:

MONTH

DAY

YEAR

Mail to: Committee on Water Well Construction — 3815 W. Roosevelt Road — Little Rock, Arkansas 72204

GEOLOGICAL COPY

FORM NO. WD-1

NEW WELL ☒REPLACEMENT WELL ☐STATE OF ARKANSAS
Report of Water Well ConstructionCounty in which well is located: Boone ✓

(Please print or type)

OWNER OF WELL DON MOOREWELL CONTRACTOR HAROLD L KINGCONTRACTOR LICENSE NO. 1151NAME OF DRILLER WALTER BSNOWDRILLER REGISTRATION NO. 02401DATE WELL WAS COMPLETED 7 28 75

MO.

DAY

YR.

Well is near 1 mile NE East and 2 mile S. County road, approximatelySection 36, Township 21N, Range 21W of Boone (TOWN, ETC.)Directions for reaching well:
(use permanent landmarks)1. Total Depth of Well 550 ft.2. Water Producing Formation: 50 ft. Limestone From 519 1/2 ft. To 570 ft.

3. Method of Construction:

Rotary ☒ Cable ☐ Driven ☐ Jetted ☐ Bored ☐ Dug ☐4. Water Level Below Land Surface 350 ft.5. Gallons per Hour 70% Chlorine GRAN Gallons per Minute 86. Well disinfected with 70% Chlorine GRAN7. Cased to 77 ft. with 6 1/4 Diameter new steel Casing8. Cemented from 50 ft. to 77 ft.9. Casing Perforated from 50 ft. to 77 ft.

10. Well Backfilled with:

lime drill cuttings from 0 ft. to 10 ft.

(SAND, CLAY, CEMENT, MUD)

11. Gravel Pack from 50 ft. to 77 ft.

12. Screen Diameter:

1 inches from 50 ft. to 77 ft.13. Type Screen 1 Fittings 1 Slot Size 1

14. Use of Well:

DOMESTIC

IRRIGATION

MUNICIPAL

OTHER

Description and Color of Formation:
(Sand, Shale, Sandstone, etc.)

Depths in Feet

From To

<u>Red clay and chunk rock</u>	<u>0</u>	<u>70</u>
<u>Grey Limestone</u>	<u>70</u>	<u>100</u>
<u>Brown Limestone</u>	<u>100</u>	<u>102</u>
<u>Grey Limestone</u>	<u>102</u>	<u>550</u>

Remarks:

Signed: HAROLD L KING by J. KingDate: 7 28 75

MONTH

DAY

YEAR

Mail to: Committee on Water Well Construction — 3815 W. Roosevelt Road — Little Rock, Arkansas 72204

GEOLOGY COPY

FORM NO. WD-1

NEW WELL ☒REPLACEMENT WELL ☐STATE OF ARKANSAS
Report of Water Well Construction

County in which well is located:

Boone

(Please print or type)

OWNER OF WELL JAMES LOPPELWELL CONTRACTOR BILL HANOLDCONTRACTOR LICENSE NO. C1077NAME OF DRILLER BILL HANOLDDRILLER REGISTRATION NO. D2141DATE WELL WAS COMPLETED 11 MO. 20 DAY 14 YR.

Well is near _____ road, approximately

5 miles N NE E (SE) S SW W NW of OMAHASection 30, Township 21, Range 21 (TOWN, ETC.)Directions for reaching well:
(use permanent landmarks)1. Total Depth of Well 4802. Water Producing Formation: From 400 ft. To 480 ft.

3. Method of Construction:

Rotary _____ Cable ☒ Driven _____ Jetted _____ Bored _____ Dug _____4. Water Level Below Land Surface 300 ft.5. Gallons per Hour 480 Gallons per Minute 86. Well disinfected with CLOROX7. Cased to 20 ft. with 6" Diameter PVC Casing8. Cemented from 14 ft. to 20 ft.

9. Casing Perforated from _____ ft. to _____ ft.

10. Well Backfilled with: CLAY from 0 ft. to 14 ft.

(SAND, CLAY, CEMENT, MUD)

11. Gravel Pack from _____ ft. to _____ ft.

12. Screen Diameter:

_____ inches from _____ ft. to _____ ft.

13. Type Screen _____ Fittings _____ Slot Size _____

14. Use of Well:

☒ DOMESTIC☐ IRRIGATION☐ MUNICIPAL☐ OTHERSigned: Bill HanoldDate: 12 MONTH 13 DAY 14 YEAR

Mail to: Committee on Water Well Construction — 3815 W. Roosevelt Road — Little Rock, Arkansas 72204

GEOLOGY COPY

FORM NO. WD-1

NEW WELL ☐REPLACEMENT WELL ☒STATE OF ARKANSAS
Report of Water Well Construction

County in which well is located:

not plotted ✓
BOONE

(Please print or type)

OWNER OF WELL JOHN ROBINSONWell is near U.S. 65 road, approximatelyWELL CONTRACTOR BILL ARNOLD4 miles N NE E SE SW W NW of OMAHA
(TOWN, ETC.)CONTRACTOR LICENSE NO. C1077Section 27 Township 21 Range 21NAME OF DRILLER BILL ARNOLDDirections for reaching well:
(use permanent landmarks)DRILLER REGISTRATION NO. D2141DATE WELL WAS COMPLETED 7 MO. 15 DAY 73 YEAR1. Total Depth of Well 640Description and Color of Formation:
(Sand, Shale, Sandstone, etc.)

Depths in Feet

2. Water Producing Formation: From 600 ft.

(Sand, Shale, Sandstone, etc.)

From To

To 610 ft.3. Method of Construction DRIVENRotary X Cable X Driven X Jetted X Bored X Dug XGreen lime 309 3604. Water Level Below Land Surface 480 ft.Pink limestone 360 3905. Gallons per Hour 120 Gallons per Minute 2Sand 390 397white limestone 397 6406. Well disinfected with CLOROX7. Cased to 12 ft. with STEEL Diameter 6 1/4 Casing8. Cemented from 0 ft. to 12 ft.9. Casing Perforated from 0 ft. to 12 ft.

10. Well Backfilled with:

Remarks:

(SAND, CLAY, CEMENT, MUD) from 0 ft. to 12 ft.old well was 309'11. Gravel Pack from 0 ft. to 12 ft.

12. Screen Diameter:

0 inches from 0 ft. to 12 ft.13. Type Screen 1 Fittings 1 Slot Size 1

Signed:

14. Use of Well:

Date:

X DOMESTIC

IRRIGATION

MUNICIPAL

OTHER

7 MONTH26 DAY73 YEAR

Mail to: Commission on Water Well Construction — 3815 W. Roosevelt Road — Little Rock, Arkansas 72204

GEOLOGY

FORM NO. WD-1

STATE OF ARKANSAS

REPORT OF WATER WELL CONSTRUCTION

New Well ☒ Work-over Well ☐ Replacement Well ☐Owner of Well BUD ESSAYWell Contractor BILL ARNOLDDriller Name and No. JOHN ROBERTS D2209Date Well was Completed 7-20-811. Total Depth of Well 688 Ft.2. Water Producing Formation: From 640 Ft.
To 650 Ft.Water Level Below Land Surface 3004. Gallons per Hour 11005. Well Disinfected with CLOROX6. Casing to 50 Ft.7. Cased with 6" Diameter PVC Casing8. Cemented from 0 Ft. to 18 Ft.9. Use of Well: ☒ Domestic ☐ Irrigation ☐ Municipal ☐ OtherCounty BOONE
(in which well is located)Well is near MAHA School RoadSection 27 Township 21 Range 21Directions for Reaching Well: 1/2 mi. W. ofSchool on old creek Rd.
(use permanent landmark)

Description and Color of Formation (sand, shale, sandstone, etc.)	Depths from	in feet to
Rock & CLAY	0	48
BOONE LIME	48	260
ST. JOE LIME	260	310
gray lime	310	688

Remarks:

Signed: Bill Arnold Date: 8-17-81

Form No. AWD-3

Mail to: Committee on Water Well Construction, 2915 So. Pine Street,
Little Rock, Arkansas 72204

GEOLOGY COPY

STATE OF ARKANSAS REPORT OF WATER WELL CONSTRUCTION

New Well ☒ Work-over Well ☐ Replacement Well ☐

Owner of Well Robert Behrens

Contractor Harold L. Kink C1451

Driller Name and No. Harold L. Kink DZ312

Date Well was Completed 7-17-82

County Boone (in which well is located)
Road _____

Well is near County
Section 27 Township 21N Range 24W

Directions for Reaching Well: 1/2 mi. S. Drake #1
(use permanent landmark)

1. Total Depth of Well 565 Ft.
2. Water Producing Formation: MOVE WATER IN FIFTY TO
LINE - 380' TO 387' From 274 Ft. to 274 1/2 Ft.

Water Level Below Land Surface 240'

Gallons per Hour 500

Well Disinfected with 9.5% Sodium Hypochlorite

Casing to 54 1/2 Ft.

Cased with 4 1/2" ID Diameter New Steel Casing

Cemented from 0 Ft. to 12 Ft.

Use of Well: ☒ Domestic ☐ Irrigation ☐ Municipal ☐ Other

Vo. AWD-3

Description and Color of Formation (sand, shale, sandstone, etc.)	Depths from	in feet to
Top soil + chunk chert	0	2
Mud	2	32
Boone line	32	36
Brittle Broken line	36	38
Boone line	38	40
Brittle line + mud	40	46
Grey line	46	380
Dolomite	380	387
Fifty line	387	565

Remarks: Top 50' + chunk chert
Mud
Boone line
Brittle Broken line
Boone line
Brittle line + mud
Grey line
Dolomite
Fifty line

Signed: Harold L. Kink Date: 7-20-82

Mail to: Committee on Water Well Construction, 2915 So. Pine Street,
Little Rock, Arkansas 72204

GEOLOGY COPY

NEW WELL ☒REPLACEMENT WELL ☐STATE OF ARKANSAS
Report of Water Well Construction

County in which well is located:

Boone

(Please print or type)

OWNER OF WELL

Nelson Rice

WELL CONTRACTOR

S. Schell

CONTRACTOR LICENSE NO.

C1215

NAME OF DRILLER

McConaughy

DRILLER REGISTRATION NO.

D2430

DATE WELL WAS COMPLETED

Sept

MO.

DAY

YR.

Well is near

road, approximately

_____ miles N NE E SE S SW W NW of _____

Section 25Township 21Range 21

(TOWN, ETC.)

Directions for reaching well:

(use permanent landmarks)

2 mi E - S. E

1. Total Depth of Well

783

2. Water Producing Formation:

From _____

ft.

To _____

ft.

3. Method of Construction:

Rotary ☒Cable ☐Driven ☐Jetted ☐Bored ☐Dug ☐

4. Water Level Below Land Surface _____

ft.

5. Gallons per Hour _____

Gallons per Minute 6

6. Well disinfected with _____

Purex7. Cased to 63 ft. with 6 5/8 Diameter Steel Casing8. Cemented from 63 ft. to 102 ft.

9. Casing Perforated from _____ ft. to _____ ft.

10. Well Backfilled with: _____

from _____

ft. to _____

ft.

(SAND, CLAY, CEMENT, MUD)

11. Gravel Pack from _____ ft. to _____ ft.

12. Screen Diameter: _____

_____ inches from _____

ft. to _____

ft.

13. Type Screen _____

Fittings _____

Slot Size _____

14. Use of Well: ☒Signed: Will J. SchellDate: 12 6 14

MONTH

DAY

YEAR

DOMESTIC

IRRIGATION

MUNICIPAL

OTHER

Mail to: Commissioner on Water Well Construction — 3815 W. Roosevelt Road — Little Rock, Arkansas 72204

GEOLOGY COPY

FORM NO. WD-1

NEW WELL ☒REPLACEMENT WELL ☐STATE OF ARKANSAS
Report of Water Well Construction

County in which well is located:

Boone

(Please print or type)

OWNER OF WELL Dean CarbowWELL CONTRACTOR Harold H. KingCONTRACTOR LICENSE NO. C1151NAME OF DRILLER Harold H. KingDRILLER REGISTRATION NO. D2402DATE WELL WAS COMPLETED 10 30 78
MO. DAY YEARWell is near county Rd. road, approximately3 miles (N E SE S SW W NW) of OmahaSection 16 Township 21N Range 21W (TOWN, ETC.)Directions for reaching well:
(use permanent landmarks) 2 1/2 mi. N. Omaha on#65 & 1/2 mi. S. county Rd.1. Total Depth of Well 7752. Water Producing Formation: Brittle Grey lime From 664 ft.

3. Method of Construction:

Rotary ☒ Cable ☐ R.C. ☐ Driven ☐ Jetted ☐ Bored ☐4. Water Level Below Land Surface 410 ft.5. Gallons per Hour 900 Gallons per Minute 156. Well disinfected with 70% chlorine granules7. Cased to 54 1/2 ft. with 6 5/8" Diameter New Steel Casing8. Cemented from 0 ft. to 10 ft.9. Casing Perforated from — ft. to — ft.

10. Well Backfilled with:

clay & lime cuttings from 10 ft. to 54 ft.
SAND, CLAY, CEMENT, MUD11. Gravel Pack from — ft. to — ft.

12. Screen Diameter:

— inches from — ft. to — ft.3. Type Screen — Fittings — Slot Size —

4. Use of Well:

☒ DOMESTIC ☐ IRRIGATION ☐ MUNICIPAL ☐ OTHERDescription and Color of Formation:
(Sand, Shale, Sandstone, etc.)

Depths in Feet

From To

<u>chunks Rock & Red clay</u>	<u>0</u>	<u>48</u>
<u>Boone lime</u>	<u>48</u>	<u>168</u>
<u>Red lime</u>	<u>168</u>	<u>176</u>
<u>Grey lime</u>	<u>176</u>	<u>210</u>
<u>176 Grey sandstone</u>	<u>210</u>	<u>218</u>
<u>Grey dolomite lime</u>	<u>218</u>	<u>775</u>

Remarks:

This well is guaranteed against defective material or workmanship for a period of

Signed:

Date:

MONTH

DAY

YEAR

Mail to: Committee on Water Well Construction - 3815 W. Roosevelt Road - Little Rock, Arkansas 72204

GEOLOGY COPY

FORM NO. WD-1

STATE OF ARKANSAS
REPORT OF WATER WELL CONSTRUCTION

New Well ☒ Work-over Well Replacement Well
Owner of Well JOHN HUSTON
Well Contractor BILL ARNOID
Contractor License No. C1077
Driller Name and No. JOHN ROBERTS D2209
Date Well was Completed DEC. 10, 1979

County BOONE
(in which well is located)

Well is near ARK. HWY. 14 Road
Section 35 Township 21N Range 21W
Directions for Reaching Well: 3 1/2 MILE E. OF
OMAHA ON HWY. 14 (use permanent landmark)
1 MILE S ON COUNTY RD

1. Total Depth of Well 496' Ft.
2. Water Producing Formation: From 441 Ft. To 445 Ft.
3. Water Level Below Land Surface 350'
4. Gallons per Hour 240
5. Well Disinfected with CLOROX
6. Casing to 38' Ft.
7. Cased with 6" Diameter PVC Casing
8. Cemented from 38 Ft. to 20 Ft.
9. Use of Well: ☒ Domestic ☐ Irrigation ☐ Municipal ☐ Other
This well is guaranteed against defective material or workmanship for a period of 1 YEAR

Description and Color of Formation (sand, shale, sandstone, etc.)	Depths from	in feet to
<u>ROCK & CLAY</u>	<u>0</u>	<u>37</u>
<u>8" LIME STONE</u>	<u>37</u>	<u>130</u>
<u>ST. JOE LIME</u>	<u>130</u>	<u>145</u>
<u>SHALE</u>	<u>145</u>	<u>180</u>
<u>SANDSTONE</u>	<u>180</u>	<u>195</u>
<u>SHALE</u>	<u>195</u>	<u>270</u>
<u>LIME STONE</u>	<u>270</u>	<u>496</u>

Remarks:
Signed: Bill Arnold Date: 1-10-80

Form No. AWD-2

Mail to: Committee on Water Well Construction, 2915 So. Pine Street,
Little Rock, Arkansas 72204

Geology Copy

NEW WELL ☒REPLACEMENT WELL ☐STATE OF ARKANSAS
Report of Water Well Construction

County in which well is located:

BOONE

(Please print or type)

OWNER OF WELL

BUD ESSARY

WELL CONTRACTOR

BILL ARNOLD

CONTRACTOR LICENSE NO.

C1077

NAME OF DRILLER

BILL ARNOLD

DRILLER REGISTRATION NO.

D2140 - D2141

DATE WELL WAS COMPLETED

7 MO. 15 DAY 76 YR.

Well is near

CRICKET

road, approximately

4 miles N NE E SE S SW W NW ofOMAHA
(TOWN, ETC.)Section 27, Township 21, Range 21.

Directions for reaching well:

(use permanent landmarks)

1/4 mile west ofOmaha High School

1. Total Depth of Well

300

2. Water Producing Formation:

From 210 ft.To 215 ft.

3. Method of Construction:

Rotary ☐ Cable ☒ Driven ☐ Jetted ☐ Bored ☐ Dug ☐

4. Water Level Below Land Surface

160 ft.

5. Gallons per Hour

100

Gallons per Minute

1*

6. Well disinfected with

CLOROX

7. Cased to

10 ft. with6" DiameterPVCSch. 40 Casing

8. Cemented from

ft. to

9. Casing Perforated from

ft. to

10. Well Backfilled with:

BENONITE & CLAY

from

0 ft. to10 ft.

(SAND, CLAY, CEMENT, MUD)

11. Gravel Pack from

ft. to

12. Screen Diameter:

inches from

ft. to

13. Type Screen

Fittings

Slot Size

14. Use of Well:

☒ DOMESTIC☐ IRRIGATION☐ MUNICIPAL☐ OTHER

Description and Color of Formation:

(Sand, Shale, Sandstone, etc.)

Depths in Feet

From

To

CLAY & ROCK04'white Limestone423'shale & lime73110'Limestone & shale mixed110300

Remarks:

JUL 22 1976

COMMITTEE ON

WATER WELL CONSTRUCTION

Signed:

Bill Arnold

Date:

7 MONTH20 DAY76 YEAR

Mail to: Committee on Water Well Construction — 3815 W. Roosevelt Road — Little Rock, Arkansas 72204

GEOLOGY COPY

FORM NO. WD-1

STATE OF ARKANSAS
REPORT OF WATER WELL CONSTRUCTION

New Well ☒ Work-over Well _____ Replacement Well _____
 Owner of Well ROBEY T. BEHYENS
 Well Contractor BILL ARNOLD
 Contractor License No. C1077
 Driller Name and No. John Roberts D2209
 Date Well was Completed 1-26-80

County Boone
 Well is near Crocket Rd. (in which well is located) Road
 Section 28 Township 21 Range 21
 Directions for Reaching Well: 5 mi South of
Omaha on 65 & 1 mi West (use permanent landmark)

1. Total Depth of Well 400 Ft.
 2. Water Producing Formation: From 280 Ft. To 300 Ft.
 3. Level Below Land Surface 280
 4. Gallons per Hour 240
 5. Well Disinfected with CLOROX
 6. Casing to 76 Ft.
 7. Cased with 6" Diameter PVC Casing
 8. Cemented from 1 Ft. to 20 Ft.
 9. Use of Well: Domestic _____ Irrigation _____ Municipal _____ Other ☒
 This well is guaranteed against defective material or workmanship for a period of 1 yr.

Description and Color of Formation (sand, shale, sandstone, etc.)	Depths from	in feet to
Clay & Rock	0	74
white lime	74	250
shale	250	265
grey lime	265	400

Remarks: _____
 Signed: Bill Arnold Date: 1-29-80

Form No. AWD-2

Mail to: Committee on Water Well Construction, 2915 So. Pine Street,
 Little Rock, Arkansas 72204

Geology Copy

STATE OF ARKANSAS

REPORT OF WATER WELL CONSTRUCTION

New Well ☒ Work-over Well _____ Replacement Well _____Owner of Well Russel and Ruth WoodsContractor Bill Arnold c1077Driller Name and No. Johnny R. Arnold D2241Date Well was Completed 10 14 1985County Boone
(in which well is located)Well is near Hwy 14 East RoadSection 254 Township 21 Range 21Directions for Reaching Well: East of
(use permanent landmark)Omaha 1 1/2 mi on Hwy 141 Total Depth of Well 650' Ft.2 Water Producing Formation: From 563 Ft.
To 568 Ft.Water Level Below Land Surface 370'Gallons per Hour 1405 Well Disinfected with Puicex6 Casing to 20 Ft.7 Cased with 6" Diameter P.V.C. Casing8 Cemented from 10 Ft. to 20 Ft.9 Use of Well: ☒ Domestic ☐ Irrigation ☐ Municipal ☐ OtherDescription and Color of Formation
(sand, shale, sandstone, etc.)Depths
from to

Dirt	0 - 15
White Limestone	15 - 180
St. Joe (Red) Limestone	180 - 190
Grey Limestone	190 - 205
Blue Shale	205 - 210
Grey Limestone	210 - 650

Remarks: _____

Signed: Johnny R. Arnold Date: 10/27/85

Form No. AWD-3

Mail to: Committee on Water Well Construction, 2915 So. Pine Street,
Little Rock, Arkansas 72204

GEOLOGY COPY

NEW WELL ☒

REPLACEMENT WELL ☐

STATE OF ARKANSAS
Report of Water Well Construction

County in which well is located:

BOONE

(Please print or type)

OWNER OF WELL CHARLES Mcmahon Jr.
WELL CONTRACTOR BILL ARNOLD
CONTRACTOR LICENSE NO. C1077
NAME OF DRILLER BILL ARNOLD
DRILLER REGISTRATION NO. D2141
DATE WELL WAS COMPLETED 6 MO. 15 DAY 77 YR.

Well is near CRICKET road, approximately 3 miles N NE E SE S SW W NW of OMAHA (TOWN, ETC.)
Section 20, Township 21, Range 21.
Directions for reaching well: (use permanent landmarks) 1/4 mi south of Omaha on U.S. 65 + west 2 1/2 mi on cricket rd. + 1/2 mi north

Total Depth of Well 412
Water Producing Formation: From 348 ft. To 352 ft.
Method of Construction: Casing Cable X R.C. Driven Jetted Bored
Water Level Below Land Surface 500 ft. Gallons per Hour 500 Gallons per Minute 84
Well disinfected with CLOROX

Description and Color of Formation: (Sand, Shale, Sandstone, etc.)	Depths in Feet	
	From	To
Rock + CLAY	0	30
Flint + lime	30	52
White limestone	52	110
ST. JAC LIME (PINK)	110	170
SHALE	170	180
GREY LIME	180	348
SHALE + LIME	348	352
WHITE LIME	352	412

Cased to 31 ft. with 6" Diameter PVC 125 PSI Casing
Cemented from 1 ft. to 10 ft.
Casing Perforated from 10 ft. to 31 ft.
Well Backfilled with: BENTONITE from 10 ft. to 31 ft.
(SAND, CLAY, CEMENT, MUD)
Gravel Pack from 10 ft. to 31 ft.
Screen Diameter: 1 1/2" inches from 10 ft. to 31 ft.
Type Screen Fittings Slot Size 1/8"
Use of Well: X DOMESTIC IRRIGATION MUNICIPAL OTHER

Remarks: RECEIVED
JUL 5 1977
This well is guaranteed against defective material or workmanship for a period of 1 YR. COMMITTEE ON WATER WELL CONSTRUCTION
Signed: Bill Arnold
Date: 6 MONTH 30 DAY 77 YEAR

Mail to: Committee on Water Well Construction - 3815 W. Roosevelt Road - Little Rock, Arkansas 72204

FORM NO. WD-1

NEW WELL ☒REPLACEMENT WELL ☐STATE OF ARKANSAS
Report of Water Well Construction

County in which well is located

Boone

(Please print or type)

OWNER OF WELL Norman GlasenerWELL CONTRACTOR JOE R PembertonCONTRACTOR LICENSE NO. 1030NAME OF DRILLER JOE R PembertonDRILLER REGISTRATION NO. 2007DATE WELL WAS COMPLETED 06T 30 77
MO. DAY YR.Well is near CRICKET RD. road, approximately4 miles N NE E SE S SW W NW of CRICKETSection 09, Township 21N, Range 21W (TOWN, ETC.)Directions for reaching well:
(use permanent landmarks)1. Total Depth of Well 5052. Water Producing Formation: From 450 ft. To 470 ft.

3. Method of Construction:

Rotary Cable X R.C. Driven Jetted Bored 4. Water Level Below Land Surface 375 ft.5. Gallons per Hour Gallons per Minute 206. Well disinfected with CLOROX7. Cased to 37 ft. with 6 1/4 Diameter STEEL Casing8. Cemented from 37 ft. to 20 ft.9. Casing Perforated from ft. to ft.10. Well Backfilled with: CLAY from ft. to ft.
(SAND, CLAY, CEMENT, MUD)11. Gravel Pack from ft. to ft.12. Screen Diameter: inches from ft. to ft.13. Type Screen Fittings Slot Size 14. Use of Well: X DOMESTIC IRRIGATION MUNICIPAL OTHER Description and Color of Formation:
(Sand, Shale, Sandstone, etc.)Depths in Feet
From To

CLAY	0	35
LIMESTONE	35	175
SHALE	175	250
SANDSTONE	250	270
LIMESTONE	270	450
SANDSTONE	450	470
LIMESTONE	470	505

RECEIVED

Remarks:

NOV 2 1977

COMMITTEE ON

This well is guaranteed against defective material WATER WELL CONSTRUCTION of

1 YEAR

Signed:

Date:

MONTH

DAY

YEAR

Mail to: Committee on Water Well Construction - 3815 W. Roosevelt Road - Little Rock, Arkansas 72204

FORM NO. WD-1

ECOLOGY AND ENVIRONMENT, INC.

DALLAS, TEXAS

MEMORANDUM

Arkwood
Reference 16

TO: David Wineman, Region VI Acting RPO

THRU: ^{for} K. H. Malone, Jr., FIT RPM *gjt*

FROM: Rick Horne, FIT Chemist

DATE: August 13, 1987

SUBJ: Sampling Inspection of Domestic Wells and Cricket Spring at Arkwood, Inc., Omaha, AR (ARD084930148)
TDD# F06-8707-113

The FIT was tasked to sample several domestic wells that lie within a 1/2 mile radius of Arkwood, Inc. in Omaha, Arkansas. FIT was also tasked to sample Cricket Spring as close to its source as possible. This sampling was conducted to verify previous sampling results.

Arkwood, Inc. is an inactive wood treating facility approximately 20 acres in size. It is located 1/4 mile south of Omaha, Arkansas, west of Route 65 (see attachment A). The site had been leased and operated by Mass Merchandisers, Inc. of Harrison, Arkansas from 1970 to 1985, when its lease expired. The property owner, Mr. H.C. Ormand, operated the site from 1962 to 1970.

The sampling was conducted on the morning of July 29, 1987 by FIT members R.D. Horne, chemist, and T.A. Lensing, Jr., biologist. Targeted domestic wells and Cricket Spring were sampled to determine if there is migration of contaminants from the Arkwood site. The water samples were analyzed for HSL organics only.

Sample locations and descriptions are listed in Table 1 and on Attachment A. Residents of the area are without phones and drillers logs for the wells are not readily available. Along with the wells, Cricket Creek was also sampled at its origin (see photo page #5) approximately 1 mile from Route 65.

The analysis of samples (see organic analysis summary sheet) indicates that no organic contaminants were present in any of the domestic drinking water wells. There is a significant amount of pentachlorophenol (5,700 ppb) and 2,3,4,5-tetrachlorophenol (70 ppb tentatively identified compound) detected in Cricket Creek.

FIT recommends installation of monitoring wells around the site to determine the migration pathways of contamination.

TABLE 1
Arkwood, Inc.
Sample Descriptions

<u>Well No.</u>	<u>Owner and Remarks</u>
1	Leatherman (formerly Behren), pH-6, domestic use, 70-80 yds. from house
2	Leatherman (formerly Behren), did not sample, pump dismantled. No access for bailer.
3	Bishkey (formerly Binam), pH-6, domestic use, 50 yds. uphill from residence.
4	Birmingham, pH-6, domestic use, 25-30 ft. from house
5	Birmingham-Pump dismantled. Well house infested with red wasp. No access for bailer. No present residence on property.
6	Miles, pH-6, domestic use, 50 ft. from house. Sample was used as a representation of background.

(10) SKIDLE STATION LOCATION DESCRIPTIONS

77-87506-1 77-87506-2 77-87506-3 77-87506-4 77-87506-5 77-87506-6

ADDRESS 1	ADDRESS 2	ADDRESS 3	ADDRESS 4	ADDRESS 5	ADDRESS 6
BECKEN'S	BISKEY'S	BLADINGHAM'S	BIRYINGHAM'S	CRICKET	ME: ES' ME:

REL. #. REL. #3 REL. #4 REL. #4 REL. #5 REL. #6

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SPRINK WATER	WATER	WATER	WATER	WATER	WATER
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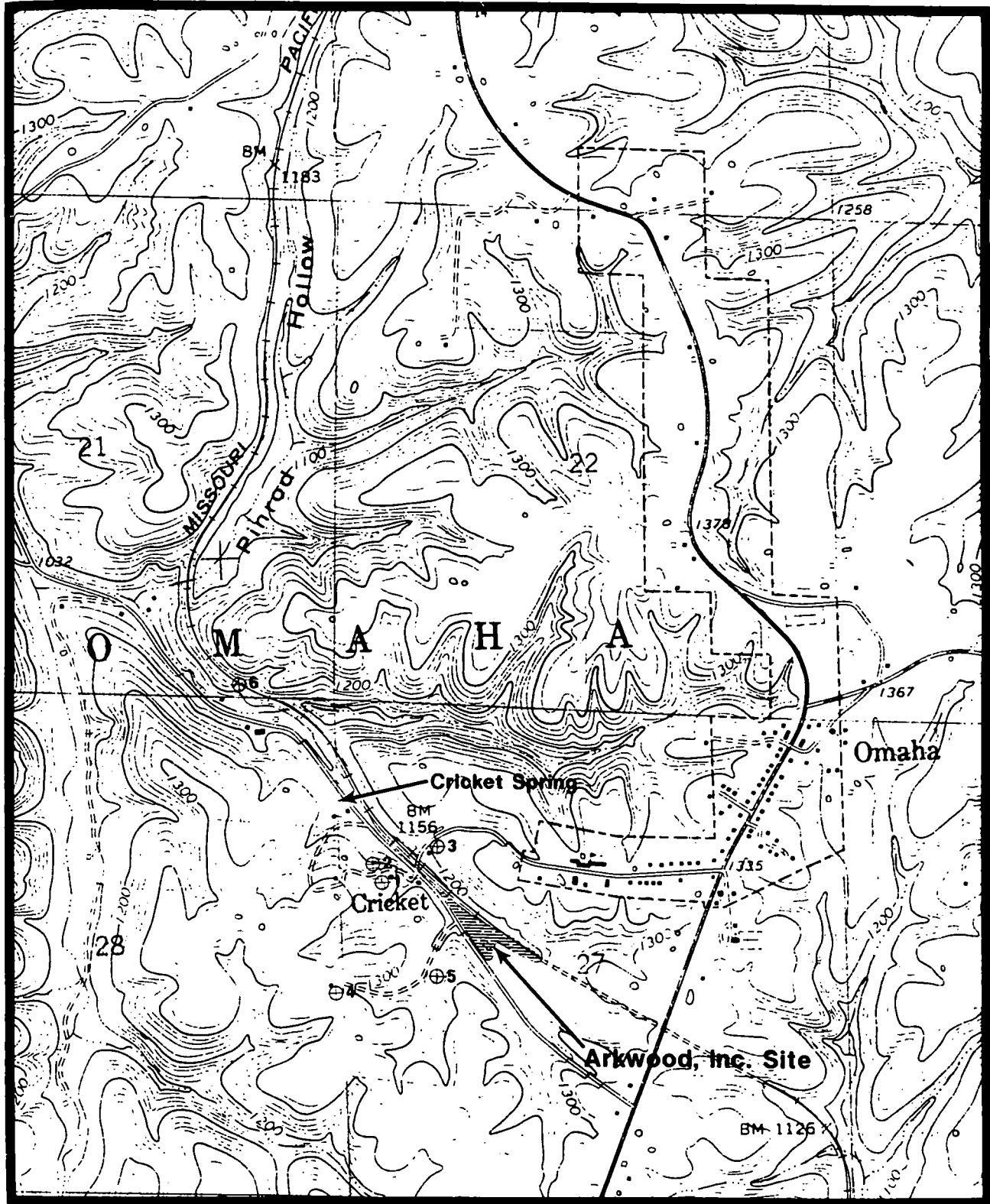
COMPOUND	CAS#	SCAN CLASS

[illegible][illegible]

1. PRIORITY POLLUTANT VOA - VOLATILE B - THE ANALYTE IS FOUND IN THE LAB BLANK C - CONFIRMED BY MASS SPECTRAL DATA
2. SPECIFIED HAZARDOUS SUBSTANCE AEA - ACID/BASE/NEUTRAL J - INDICATES AN ESTIMATED VALUE FOR TENTATIVELY
3. TENTATIVELY IDENTIFIED PES - PESTICIDE IDENTIFIED COMPOUNDS OR COMPOUNDS FOUND
BELOW CONTRACT DETECTION LIMIT
P - PRESENT IN SAMPLE, BUT NOT REPORTED BY LAB

Attachment A

Well Locations



Arkwood, Inc.
Omaha, Arkansas

⊕ Number = Well Description

[illegible]

Distribution: Original Accompanies Shipment; Copy to Coordinator Field File

6-00046

[illegible]

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

6-10103



Arkwood, Inc.
Onaka, Ark.
ARD 08490148
pg 1 of 5

Photographer / Witness

A. Home / T. Lenny

Date / Time / Direction

7/29/87 7:38 South

Comments: Bekran's well

75 yds uphill from
residence



Photographer / Witness

A. Home / T. Lenny

Date / Time / Direction

7/29/87 8:00 Northwest

Comments: Bekran's

dismantled well

Arkwood, Inc.
Oklahoma, Ark.
ARD 04890148
pg. 2 of 5



Photographer / Witness

R. Horne / T. Lenny

Date / Time / Direction

7/29/87 8:01 East

Comments: Inside of

Bahren's dismantled
well



Photographer / Witness

R. Horne / T. Lenny

Date / Time / Direction

7/29/87 10:38 Northeast

Comments: Miles' Well,

Background



Arkwood, Inc.
Omaha, Ark.
AR008490148
Pg. 3 of 5

Photographer / Witness

R. Howe / T. Henry

Date / Time / Direction

7/29/87 9:35 West

Comments: Inside of

Biskay well house



Photographer / Witness

R. Howe / T. Henry

Date / Time / Direction

7/29/87 9:35 North

Comments: Biskay well house

50 yds uphill of
residence

Arkwood, Inc.
Omaha, Ark.
ARD 08490148
pg. 4 of 5



Photographer / Witness

R. Home / T. Loring

Date / Time / Direction

7/29/87 8:46 South

Comments: Birmingham's

Wall



Photographer / Witness

R. Home / T. Loring

Date / Time / Direction

7/29/87 9:08 North

Comments: Pathway to

Crick Spring

Arkwood, Inc.
Okeaha, Ark.
A1008490148
pg. 5 of 5

Photographer / Witness

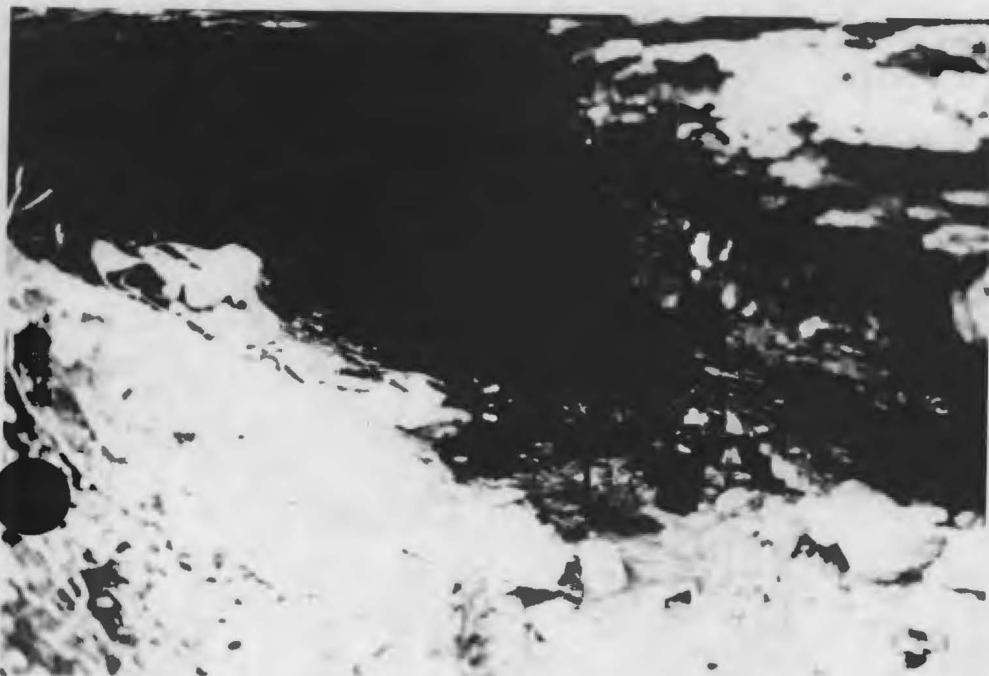
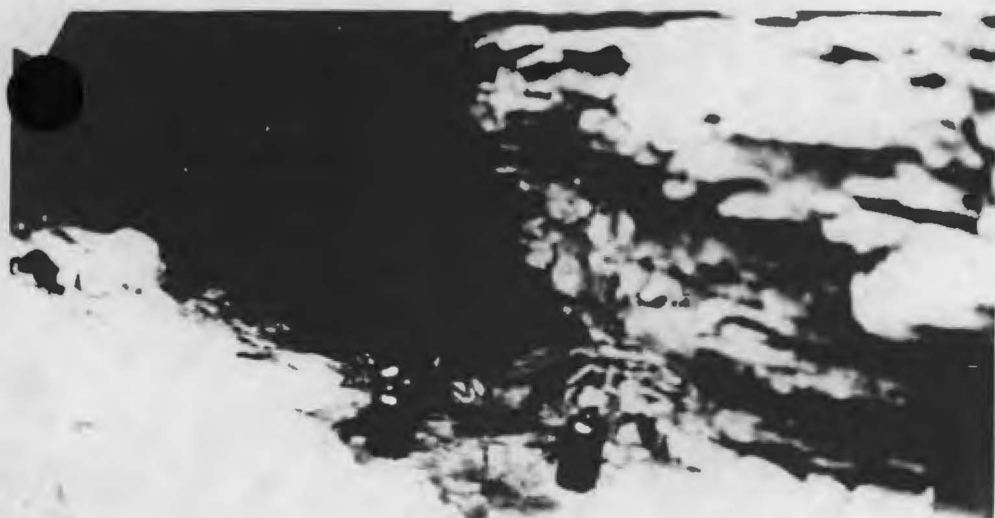
A. Howe / T. Fleming

Date / Time / Direction

7/29/87 9:08 South

Comments: Origin of

Cricket spring



Photographer / Witness

A. Howe / T. Fleming

Date / Time / Direction

7/29/87 9:08 South

Comments: Origin of

Cricket Spring

Enseco

Priority Pollutant Semivolatile Organics

Method 625


ent Name: ERM-SOUTHWEST, INC.
 ent ID: Spring 2 - *Cumart Spring*
 ID: 041235-0010-SA Enseco ID: 67183-10
 rix: AQUEOUS Sampled: 19 APR 88 Received: 21 APR 88
 horized: 27 APR 88 Prepared: 27 APR 88 Analyzed: 10 MAY 88

Parameter	Result	Units	Reporting Limit
enol	ND	ug/L	50
is-(2-Chloroethyl)ether	ND	ug/L	50
-Chlorophenol	ND	ug/L	50
,3-Dichlorobenzene	ND	ug/L	50
,4-Dichlorobenzene	ND	ug/L	50
,2-Dichlorobenzene	ND	ug/L	50
is(2-Chloroisopropyl)ether	ND	ug/L	50
-Nitroso-di-n-propylamine	ND	ug/L	50
exachloroethane	ND	ug/L	50
itrobenzene	ND	ug/L	50
sophorone	ND	ug/L	50
-Nitrophenol	ND	ug/L	50
,4-Dimethylphenol	ND	ug/L	50
is(2-Chloroethoxy)methane	ND	ug/L	50
,4-Chlorophenol	ND	ug/L	50
,2,4-Trichlorobenzene	ND	ug/L	50
aphthalene	ND	ug/L	50
exachlorobutadiene	ND	ug/L	50
-Chloro-3-methylphenol	ND	ug/L	50
exachlorocyclopentadiene	ND	ug/L	50
,4,6-Trichlorophenol	ND	ug/L	50
-Chloronaphthalene	ND	ug/L	50
dimethyl phthalate	ND	ug/L	50
cenaphthylene	ND	ug/L	50
cenaphthene	ND	ug/L	50
,4-Dinitrophenol	ND	ug/L	250
-Nitrophenol	ND	ug/L	250
,2,4-Dinitrotoluene	ND	ug/L	50
,6-Dinitrotoluene	ND	ug/L	50
diethyl phthalate	ND	ug/L	50
-Chlorophenyl phenyl ether	ND	ug/L	50
luorene	ND	ug/L	50
,6-Dinitro-2-methylphenol	ND	ug/L	250
,2-Diphenylhydrazine	ND	ug/L	50
-Nitrosodiphenylamine	ND	ug/L	50
-Bromophenyl phenyl ether	ND	ug/L	50
hexachlorobenzene	ND	ug/L	50
pentachlorophenol	1000	ug/L	250
phenanthrene	ND	ug/L	50
anthracene	ND	ug/L	50
di-n-butyl phthalate	ND	ug/L	50
luorene	ND	ug/L	50

ND=Not Detected
 NA=Not Applicable

Reported By: John Gildersleeve

Approved By: Bob Mitzel



Mass Merchandisers, Inc.

January 14, 1986

Mr. Lou Barinka (6H-EE)
U. S. Environmental Protection Agency
1201 Elm Street
Dallas, TX 75270

Re: Arkwood, Inc. (Omaha, Arkansas)

Dear Mr. Barinka:

I am writing this letter in response to your October 31, 1985 inquiry regarding the Arkwood, Inc. wood treating plant. Mass Merchandisers, Inc. ("MMI") leased and operated the wood treating plant at the Arkwood site in Omaha, Arkansas, from 1973 to 1984. As you requested, we have reviewed the questions in your October 21, 1985 letter and provide the following responses:

(1) MMI utilized pentachlorophenol and creosote as wood preservatives dissolved in oil as a solvent.

(2) MMI estimates that it purchased and utilized as raw materials at the Arkwood site the following quantities of oil, creosote and pentachlorophenol:

ESTIMATED QUANTITY OF RAW MATERIALS USED

<u>YEARS</u>	<u>PENTACHLOROPHENOL</u>	<u>CREOSOTE</u>	<u>OIL</u>
1973	80,000 lbs.	-	200,000 gal.
1974	120,000 "	-	300,000 "
1975	81,845 "	32,700 gal.	204,613 "
1976	139,484 "	55,000 "	348,712 "
1977	97,120 "	35,000 "	242,800 "
1978	124,519 "	60,000 "	311,299 "
1979	134,720 "	67,360 "	336,801 "
1980	133,994 "	68,000 "	334,987 "
1981	92,120 "	65,000 "	230,300 "
1982	55,937 "	68,000 "	139,894 "
1983	51,800 "	75,000 "	129,500 "
1984	21,883 "	26,964 "	54,708 "

(3) Previously used pressure treatment pentachlorophenol treating solutions were picked up by Don Schaeffer of Omaha, Arkansas for use as a non-pressure treatment wood preservative solution.

(4) Records pertaining to MMI's operation of the Arkwood site are in the custody of Mass Merchandisers, Inc., Highway 43E, P. O. Box 790, Harrison, Arkansas 72601, telephone (501) 741-3425.

(5) MMI operated a single cylinder, pressure treatment wood preservative operation at the Arkwood site from 1973 to 1984. In addition to Pentachlorophenol, creosote and oil, MMI received, processed and handled wood in the form of logs, poles, posts, ties and other lumber products.

(6) MMI asked a local resident knowledgeable in the vicinity's geology to describe the geology of the Arkwood site. A copy of this description is attached as Exhibit A to this response. MMI also retained Geraghty & Miller to conduct a formal hydrogeologic investigation. Preliminary field work has been done by Geraghty & Miller, but no formal report has been prepared as of this date. Groundwater samples have been collected and reported to the Arkansas Department of Pollution Control and Ecology over the past several years. These sample analyses were reflected in EPA's HRS ranking package for the Arkwood site, but they have not yet been compiled into any formal report. MMI expects that Geraghty & Miller's study will compile all prior data and report them together with any new data generated.

(7) MMI plans to have Geraghty & Miller continue its work through the completion of a formal hydrogeologic investigation of the Arkwood site.

(8) MMI has no drawings of the size or detail requested. The best drawing available is attached as Exhibit B to this response. For additional information regarding the facility please contact me. The boundaries of the property leased by MMI are set forth in the legal description in the lease, which is reproduced as Exhibit C of this response. (It should be noted that the nominal lessor, Mountain Enterprises, Inc. was a wholly-owned subsidiary of MMI.) The actual Arkwood premises occupied only a portion of the property encompassed by the legal description of the lease. The owner has supplied MMI with a legal description of the treatment plant premises portion of the property. A copy of this legal description is attached as Exhibit D to this response.

(9) MMI is aware of the following storage tanks, sumps, impoundments and pits:

1. Treatment Cylinders. At the time MMI leased the premises, the Arkwood plant had an above-ground steel pressure treatment cylinder with capacity of approximately 6,000 gallons. The cylinder was used to pressure treat wood with creosote and pentachlorophenol. The cylinder is presently empty, intact and still located at the Arkwood plant site.

2. Creosote Tanks. At the time MMI leased the premises, the Arkwood plant had three above-ground steel tanks associated with creosote treatment, each with a capacity of approximately 6,000 gallons. One tank was used for creosote storage, one was used for oil storage and one was used for mixing and holding work batches of oil and creosote. The tanks are presently empty, intact and still located at the Arkwood plant site.

3. Pentachlorophenol Tanks. At the time MMI leased the premises, the Arkwood plant had three above-ground steel tanks associated with pentachlorophenol treatment. One tank, with a capacity of approximately 6,000 gallons, was used to store work batches of pentachlorophenol treating solutions. The second tank also approximately 6,000 gallons was used as a mix tank to mix pentachlorophenol and wood treating oil. The third tank, with a capacity of

approximately 12,000 gallons, was used as an oil storage tank. In 1981 MMI added a fourth tank which was a bulk storage pentachlorophenol tank and held approximately 60,000 pounds of solid pentachlorophenol crystals. The pentachlorophenol mix tank and work tank are empty, intact and still located at the Arkwood plant site. The bulk storage tank was sold and removed from the site in 1985.

4. Building Sump. At the time MMI leased the premises, the treatment cylinders and tank piping of the Arkwood plant fed into a small treatment building, which had a steel reinforced concrete sump to catch drippage and spillage. The capacity of the sump is approximately 7,500 gallons. The treatment building and sump are still intact on the site. From time to time, storm-water appears to collect in the sump, but at the time of most recent observations, the sump was empty.

5. Railroad Ditch. At the time MMI leased the premises, waste oils and treating solutions were pumped to the edge of an embankment, from which they drained into a ditch area adjacent to the railroad right-of-way on the north property line. MMI ceased use of this ditch in 1973 or 1974, but a residue of sludgy soils remain that is approximately 40 feet long, 15 feet wide and an estimated 3 feet deep.

6. Waterborne Pentachlorophenol Tank. In 1984 MMI acquired a steel tank with a capacity of approximately 12,000 gallons, which MMI hoped to use in a new waterborne pentachlorophenol treatment process. The tank was moved to the plant site, but never installed or filled, because MMI never implemented the proposed waterborne treatment process. The tank was removed in 1985 to the grounds of MMI's main offices in Harrison, Arkansas, where it is still located, empty, intact and unused.

7. Spill Containment Basin. In 1982 MMI constructed concrete spill containment dikes and pad in the area of the pentachlorophenol tanks. The spill containment structure has a capacity of approximately 12,000 gallons. It is empty, intact and still located at the plant site.

All of the items listed in 9 (1) - (5) above were installed by the owner or predecessor operators of the Arkwood site at a time prior to MMI's entry into the premises in 1973.

(10) The owner of the Arkwood site is Hallie C. Ormond. MMI operated the site under lease from Ormond. The lease from Ormond expired on January 1, 1985. From 1965 until 1973, the wood treating plant at the Arkwood site was operated by Arkwood, Inc., an Arkansas corporation organized by Hallie Ormond, C. C. Grisham (Ormond's son-in-law) and Ormond's two daughters, Mary Jo Grisham and Ina Farmer. Arkwood, Inc. conveyed its tangible assets to MMI in 1973 and

Mr. Lou Barinka
January 14, 1986
Page 4

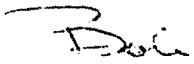
formally dissolved in 1974. The proceeds of the dissolution of Arkwood, Inc. were distributed to C. C. Grisham and Mary Jo Grisham, who were then the corporation's only shareholders. Prior to Arkwood, Inc.'s incorporation, the Arkwood treating plant was constructed and operated as a personal proprietorship by Hallie Ormond, the landowner, and possibly others.

(11) Copies of insurance policies available to MMI are reproduced as Exhibit E to this response. MMI believes that additional policies may be relevant and is enquiring into this issue. Insurance for these periods was written by Ormond Insurance, which is operated by the landowner's nephew. Thus far, inquiries have not been successful in identifying additional policies.

MMI wishes to cooperate with EPA and the State of Arkansas in every respect to the Arkwood site. If you desire any further information, please do not hesitate to contact us.

Respectfully yours,

MASS MERCHANDISERS, INC.


C. R. Barker
Vice President-Support Services

CRB/ms

Attachments

cc: Arkansas Department of Pollution Control & Ecology

REF. 18

Kelly Kissel
II

SITE VISIT Enter Site 07:45. 7/11/86

Point 1 - Along road - piles of sawdust, lumber, penton posts, trees, rock down to ditch along railroad

Roadside berm - appears to be site scrapings, sawdust, contaminated entire length of site

Point 2 - Steam discharge from tank cleaning. Tires, steel bands, sawdust staining. Also runoff of process area

Point 3 - Length - approx 125' of visually contaminated soils. Black stains

Point 4 - Contaminated mats in berm, steel strappings. Burn on tree

Point 5 - Tank. Tilted to one end. Black liquid on ground $\frac{1}{2}$ pipe. Tank empty

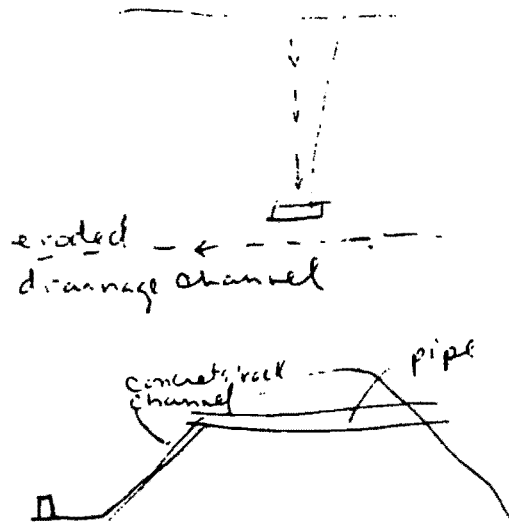
Point 6 - Drainage pipe. Leads past process area to man pipe at bank. Contaminated sawdust mounded at entry to pipe

Office - Sample bottle boxes - Dioxin analyses. IT Corp Knoxville

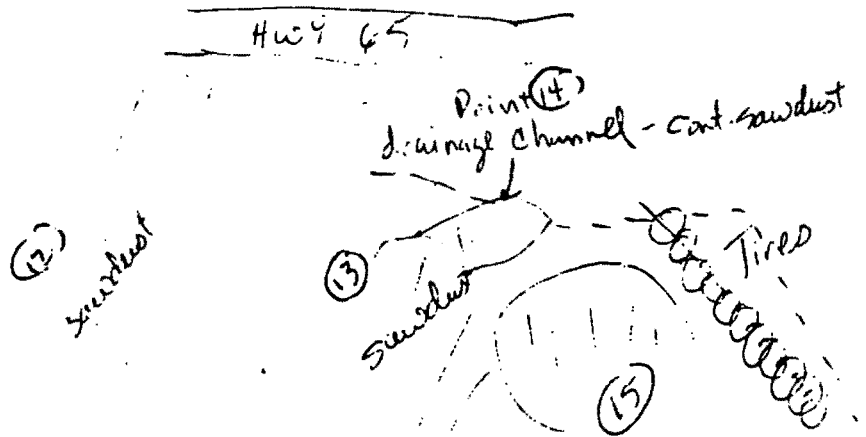
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Point 7



Point 12/13



Point 7 - Concrete & stone drainage path coming down hill, structure at bottom several feet high to slow flow, runs into channel on site

3

Point 8 - visual surface staining leading to drainage channel

Point 9 - burning on hillside debris
Also sunken area, debris potential cause?

Point 10 - visual surface staining

Point 11 - pile of debris

Point 12 - mound of sawdust up hillside
steel shrapnel. No visual staining in some places. Black in others
Ravine filled in. Nearly all the way to road
Fence line to north.
Small amount of sawdust on ground to road

Point 13 - Sawdust mound to south of Point 12. Black staining on dead trees

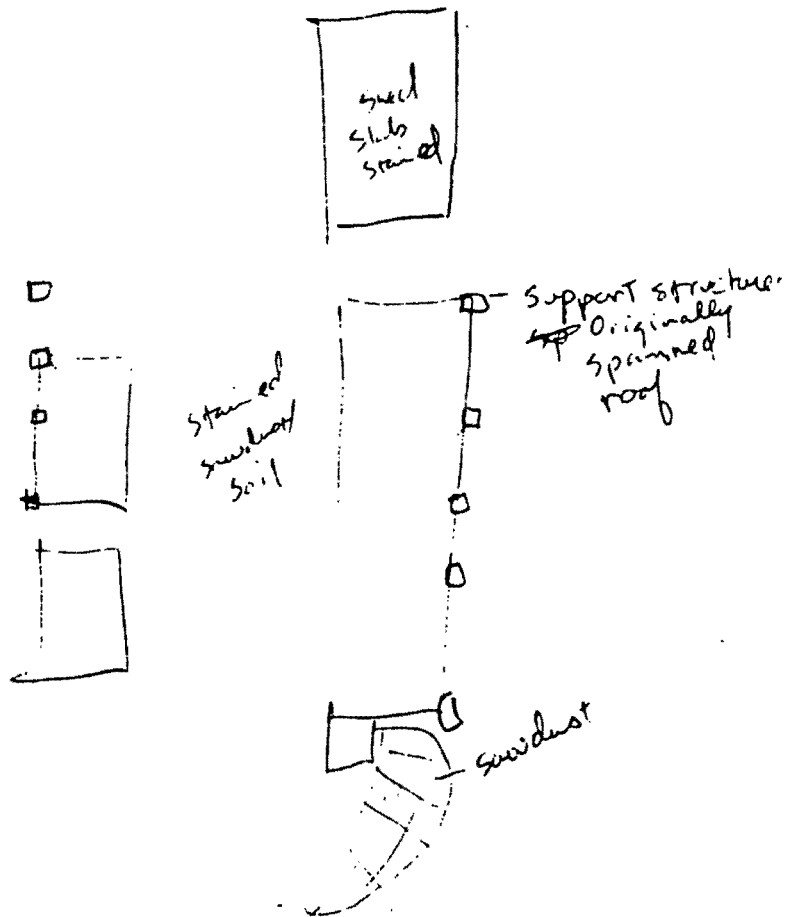
Point 14 - drainage channel. Cont. sawdust in bottom

Point 15 - Sawdust pile that has been measured in files

12

Point 23/24

4



Point 16 - Scrap on other side of ties

Point 17 - Pile of burned ties

5

Point 18 - Mounds of scraped soil along drainage channel. Strapping placed on channel bank

Point 19 - Debris mound blocks channel forces to run thru slit

Point 20 - Scrap metal, tanks
Drum w/ band - possible dipping

Point 21 - Drain pipe thru road. Gravel mound for erosion. Pile of visually cut material adjacent. Scraped material down gradient

Point 22 - Concrete pad. Investigate that it didn't cover something.

Point 23 - ^{shed} Slab has visually staining
Staining out onto ground at bldg front

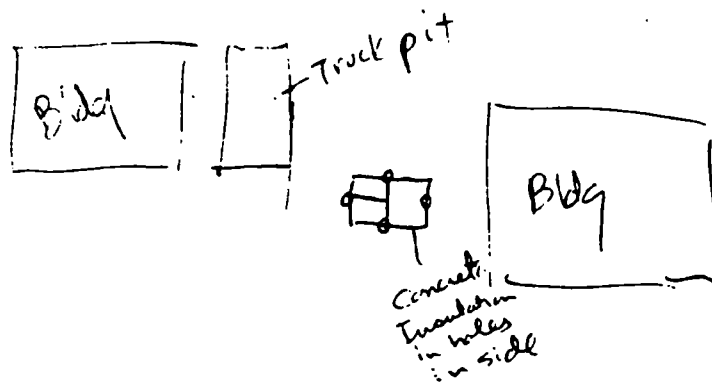
Point 24 - Rail lines have heavy visual staining on ground. Visual staining below surface

Point 25 - Tank behind small concrete

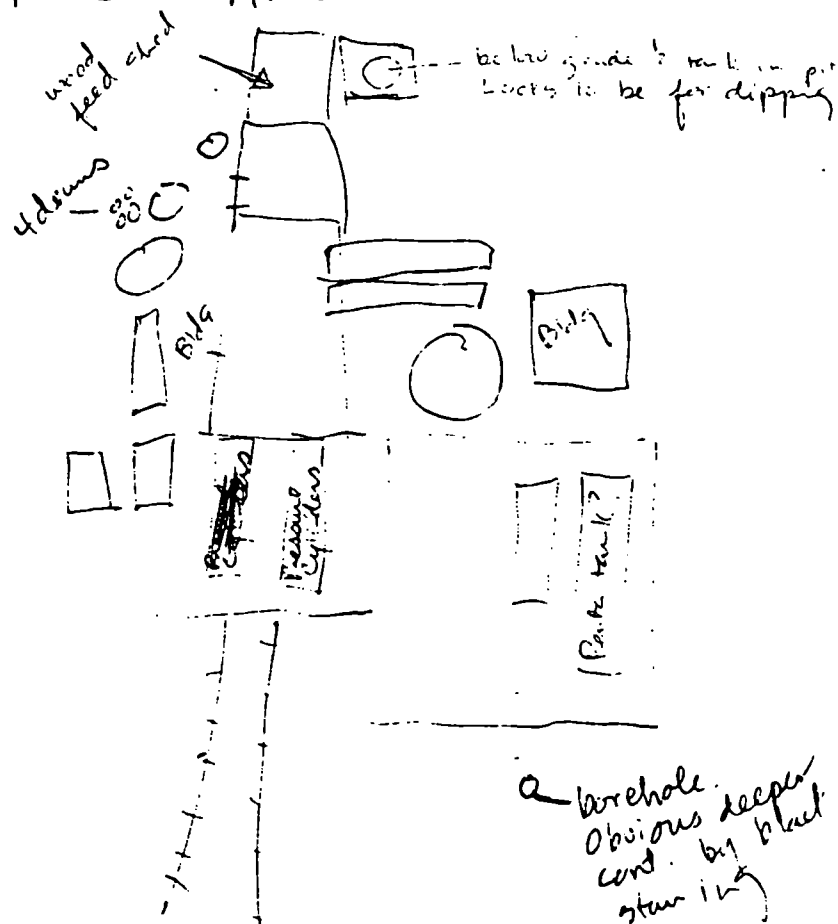
structures
generally
lined
of

Point 26/27 Possible ~~well~~

6



Process Area



Point 26 - Concrete block bldg.
Tank inside w/ insulation.
Asbestos? Roof insulation =
fiberglass
Possible well location

①

Point 27 - Bldg w/ truck pit by side

Process area

Penta tank appears to be the one
diked

(Pit below pressure cylinders full)
of black material

Outside of pressure cylinders black/oily
Heavy contamination along rail line
Heavy contamination around all
tanks

upping

open
black

Drainage ditch along RR track

(B)

③ Tunnel
sep
of water

②

④

crossing

Drainage Ditch to North

① sawdust

② P.T

③ Tunnel

⑨

Pockets of tar along ditch

Drainage visually thru tunnel
but map shows split. May
have to survey

Spring along road to west. Seep
heavily contaminated to s. side
Floating brown material, black, too.
Up side of banks
Small seep on n. side.
Black tar along stream cut

1st Intermittent Creek intersection

Dry. Visual evidence of staining
odor

Cricket Creek - dry, no staining

